VOL. XXVI. Nº 11. NOVEMBER 1941

MECCANO MAGAZINE

PLACING CONCRETE AT NORRIS DAM, U.S.A.

6D.

THE FASCINATING COLLECTING HOBBY

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DINKY TOYS

PERFECT MINIATURES

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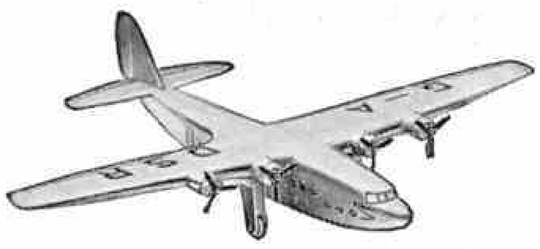
ARMSTRONG WHITWORTH "ENSIGN" AIR LINER

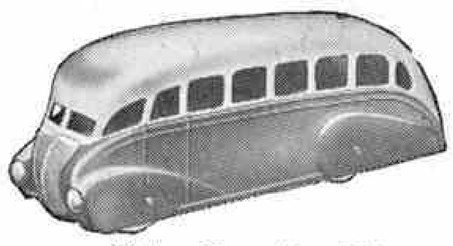


Dinky Toys No. 62p

Scale model of the largest British air liner. Six models available named: "Ensign," "Elsinore," "Explorer," "Echo," "Ettrick," and "Elysian."

Price **2/0½** with Tax **2/6**

STREAMLINED BUS

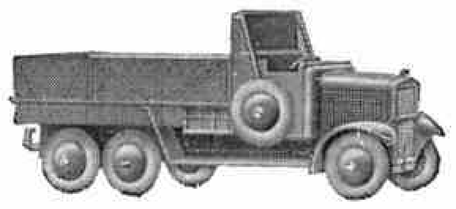


Dinky Toys No. 29b

Fitted with rubber tyres.

Price **10d.** with Tax **1/-**

SIX-WHEELED WAGON

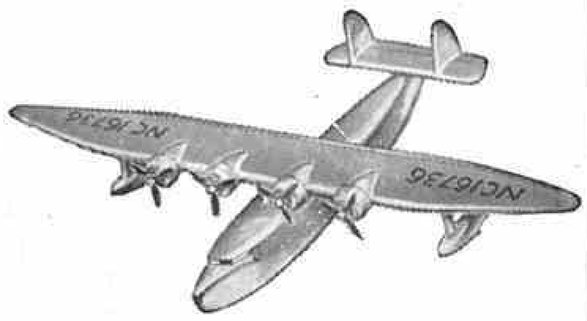


Dinky Toys No. 25s

An interesting model of a modern three-ton wagon. In assorted colours.

Price **1/7½** with Tax **2/-**

FLYING BOAT "CLIPPER III"



Dinky Toys No. 60w

Scale model of the Pan American Airways flying boat that took part in the trans-atlantic experimental flights in 1937.

Price **2/0½** with Tax **2/6**

18-POUNDER QUICK-FIRING FIELD GUN UNIT

Dinky Toys No. 162

Comprises scale models of an 18-pounder Quick-Firing Field Gun, Trailer and "Light Dragon" Motor Tractor.

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162b Trailer Price **10d.** with Tax **1/-**

162c Gun „ **10d.** „ **1/-**

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Fitted with detachable rubber tyres.

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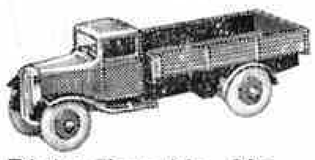

Dinky Toys No. 22c

Assorted colours. Fitted with detachable rubber tyres.

Price **10d.** with Tax **1/-**

STREAMLINED RACING CAR

Dinky Toys No. 23s

Similar in type to the "Thunderbolt" speed car. Assorted colours.

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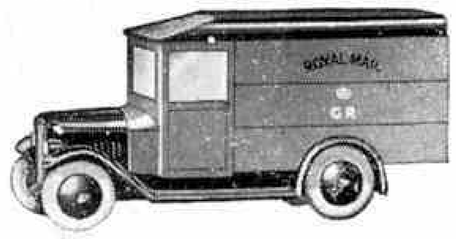
POSTAL SET



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No. 12a	Pillar Box, G.P.O.	**5½d.** with Tax **7d.**
No. 12b	Pillar Box, Air Mail	**5½d.** with Tax **7d.**
No. 12c	Telephone Call Box	**7½d.** with Tax **9d.**
No. 12d	Telegraph Messenger... ...	**5½d.** with Tax **7d.**
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No. 34b	Royal Mail Van	**1/5½** with Tax **1/9**

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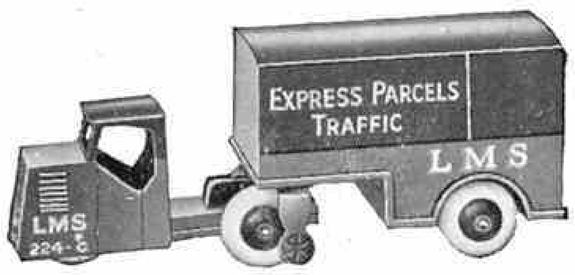
DOUGLAS DC-3 AIR LINER

Dinky Toys No. 60t

Scale model of the Douglas DC-3 air liner, which is in regular service on many American routes.

Price **1/5½** with Tax **1/9**

RAILWAY MECHANICAL HORSE AND TRAILER VAN



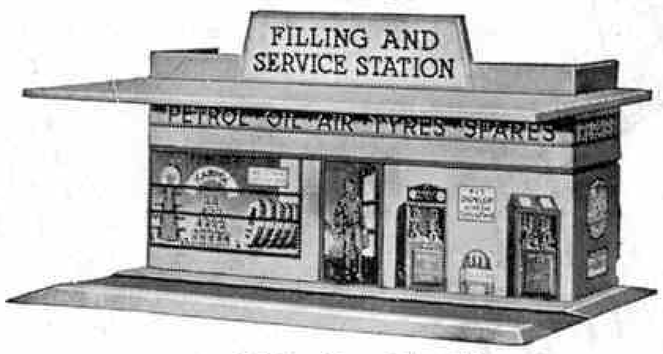
Dinky Toys No. 33R

No. 33Ra Railway Mechanical Horse. Price **1/0½** with Tax **1/3**

No. 33Rd Trailer Van. Price **1/3** with Tax **1/6**

Complete Set, L.M.S., L.N.E.R., G.W.R., or S.R. Price **2/3** with Tax **2/9**

PETROL STATION



Dinky Toys No. 48

Accurate reproduction of a filling station.

Price **2/0½** with Tax **2/6**

SPECIAL NOTICE

Will readers of the "*Meccano Magazine*" please note that, due to pressure of other work, we have been compelled temporarily to discontinue our Repairs Department, and no further work of this kind can be accepted.

When we are able to resume work in our Repairs Department we will at once make an announcement in the "M.M." and to our dealers.

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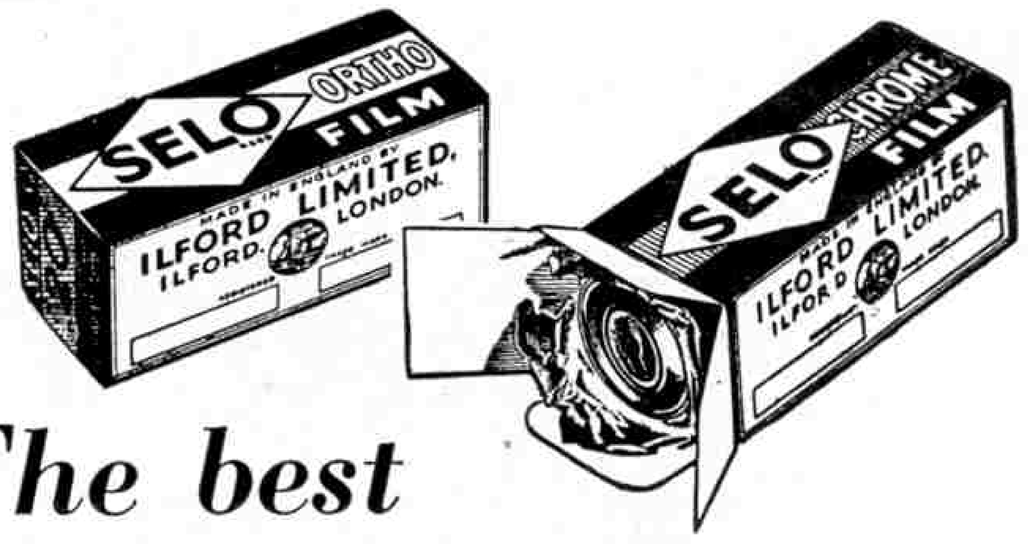

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When Ilford Limited can again devote all its energies to your needs, British made Selo Films and other Ilford photographic products will once more be obtainable everywhere ; and, as before, they will be found to be the best in the world.

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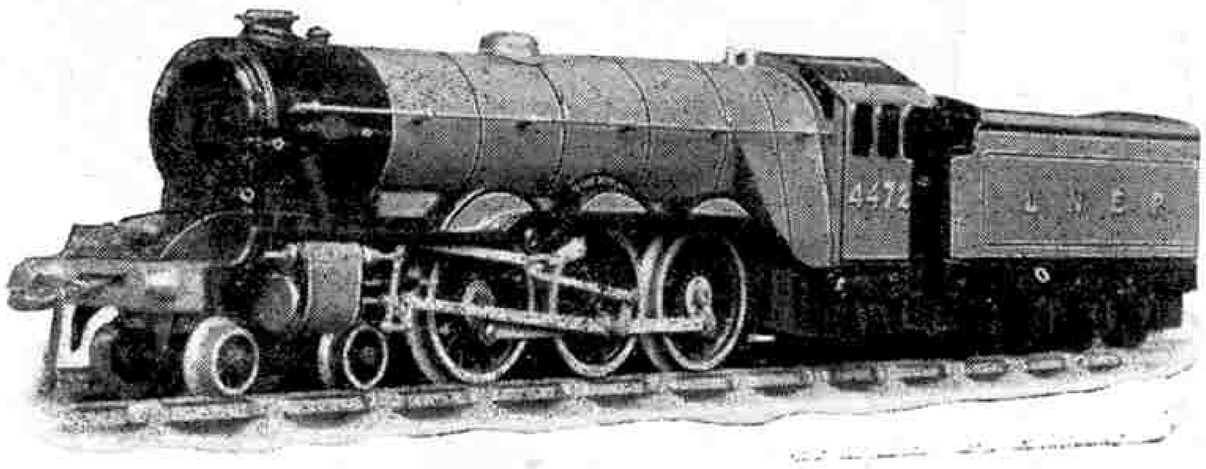

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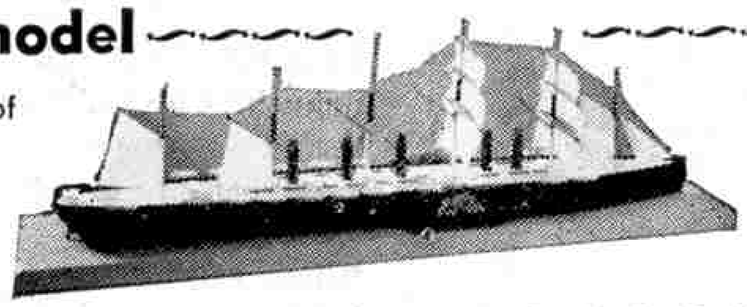
A 50 ft. to 1 in. miniature of Brunel's historic experiment in Propulsion by Sail, Screw and Paddle. The ship that laid the Atlantic Cable!



GREAT EASTERN

This attractive model set includes carved hull, decking, scale parts, funnels, masts, sails, plans, special instructions for building, tools and paint. The set complete - **18/-**

Ship Model Enthusiasts will want S.17 Model Ship Catalogue. Price 6d.

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  NEW WARTIME LIST WTC/17 of Model Supplies. Price 1/- post free.
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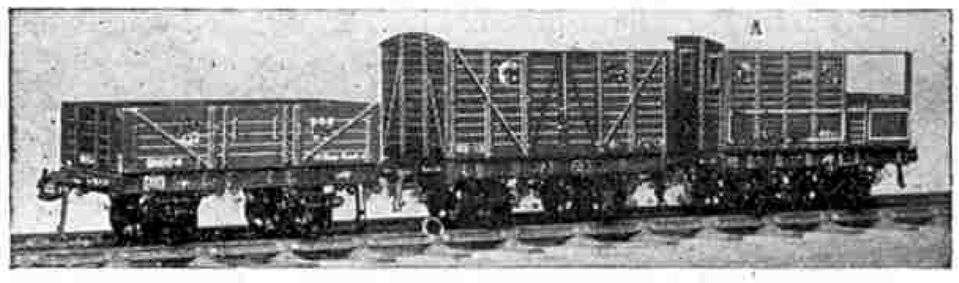

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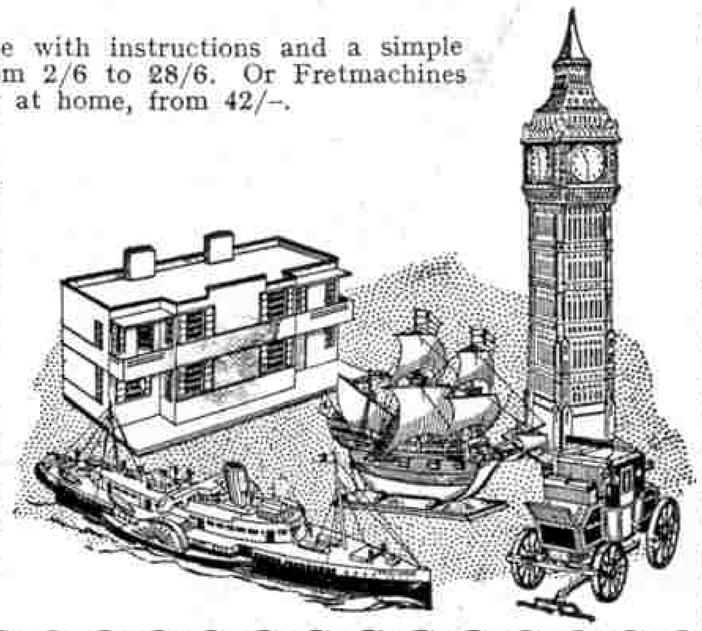

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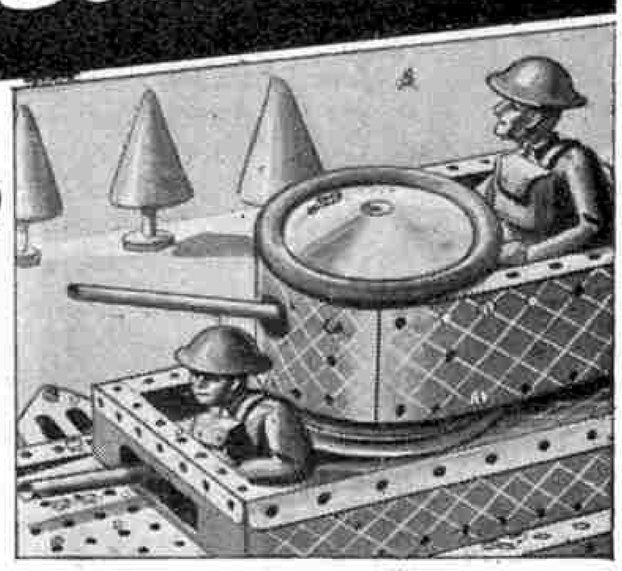

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Cycle tubular frame and forks, 14 in. wheels, 1⅛ in. jointless sponge-rubber tyres. Ball-bearing pedals. Roller lever brake. Two-coil saddle. Chain cover. Stand. PLATED FITTINGS.

MINIC
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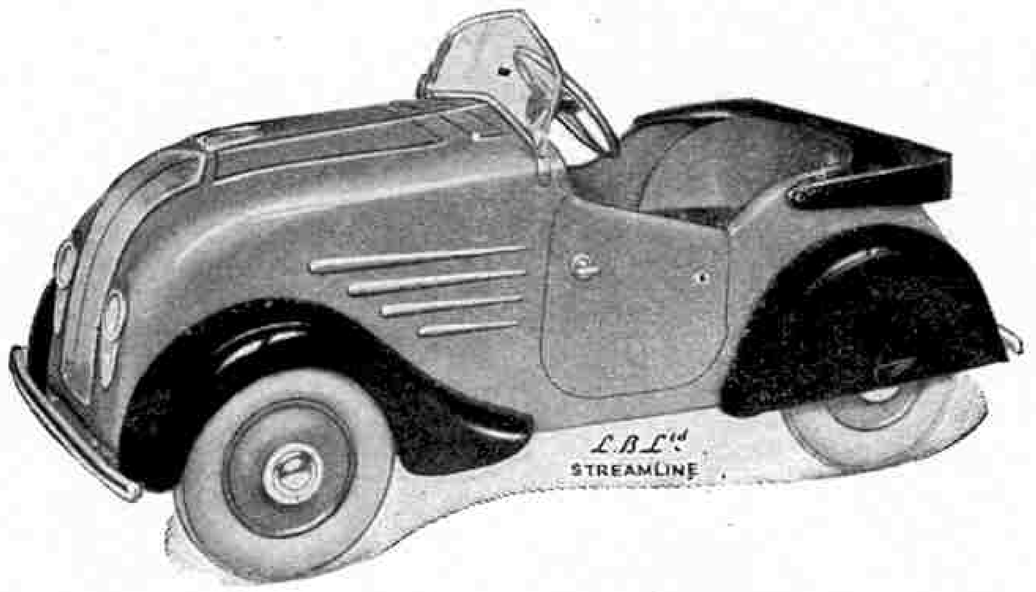
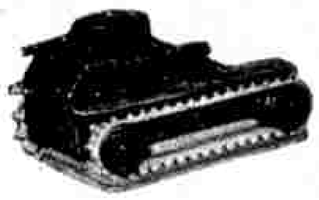
Almost every type of road transport is represented. Each model is strongly constructed and fitted with long-running mechanism and some are fitted with electric lights.



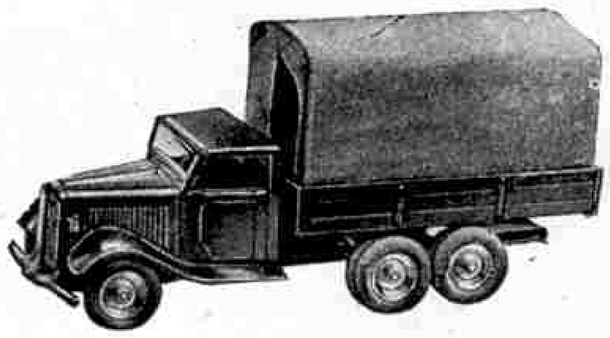
STREAMLINE

Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs, ⅝ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.



MINIC Tank. Length 3½ ins. Obtainable in camouflage colours.

MINIC Mechanical Horse and Milk Tanker.

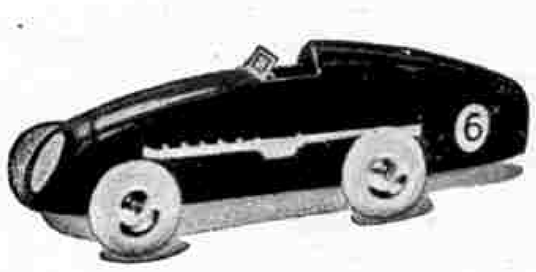


MINIC Canvas Tilt Lorry. Obtainable in camouflage colours.

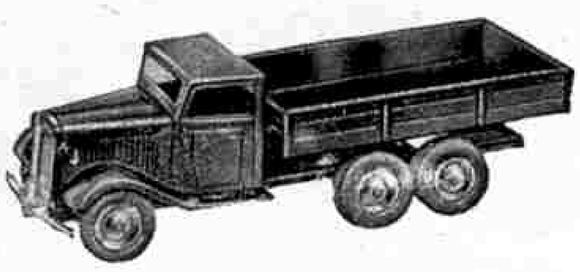
MINIC Farm Lorry

MINIC Transport Van.

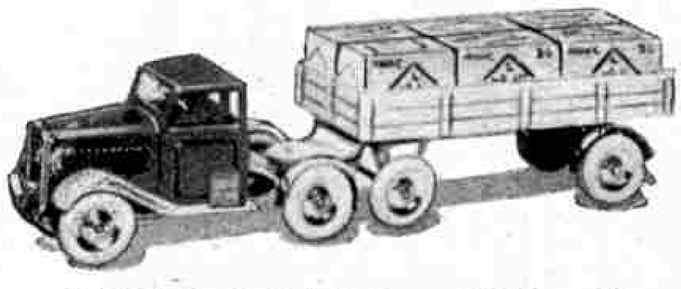
MINIC Traffic Control Car.



MINIC Racing Car. Length 5½ ins.

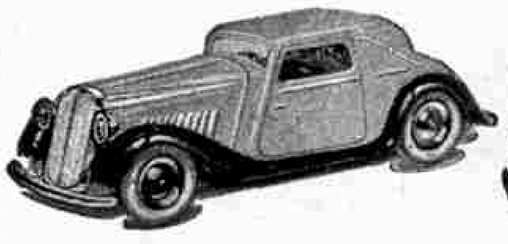


MINIC Six Wheel Army Lorry.



MINIC Mechanical Horse and Trailer with Cases. Length 7⅞ ins.

MINIC Mechanical Horse and Lorry with Barrels.



MINIC Vauxhall Cabriolet. Obtainable in camouflage colours.

MINIC Timber Lorry. Length 5⅛ ins.

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Next Month: "THIS BOMBING BUSINESS." Publishing Date: 1st December

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 11
November 1941

With the Editor

Mechanising the "Two-Pounder"

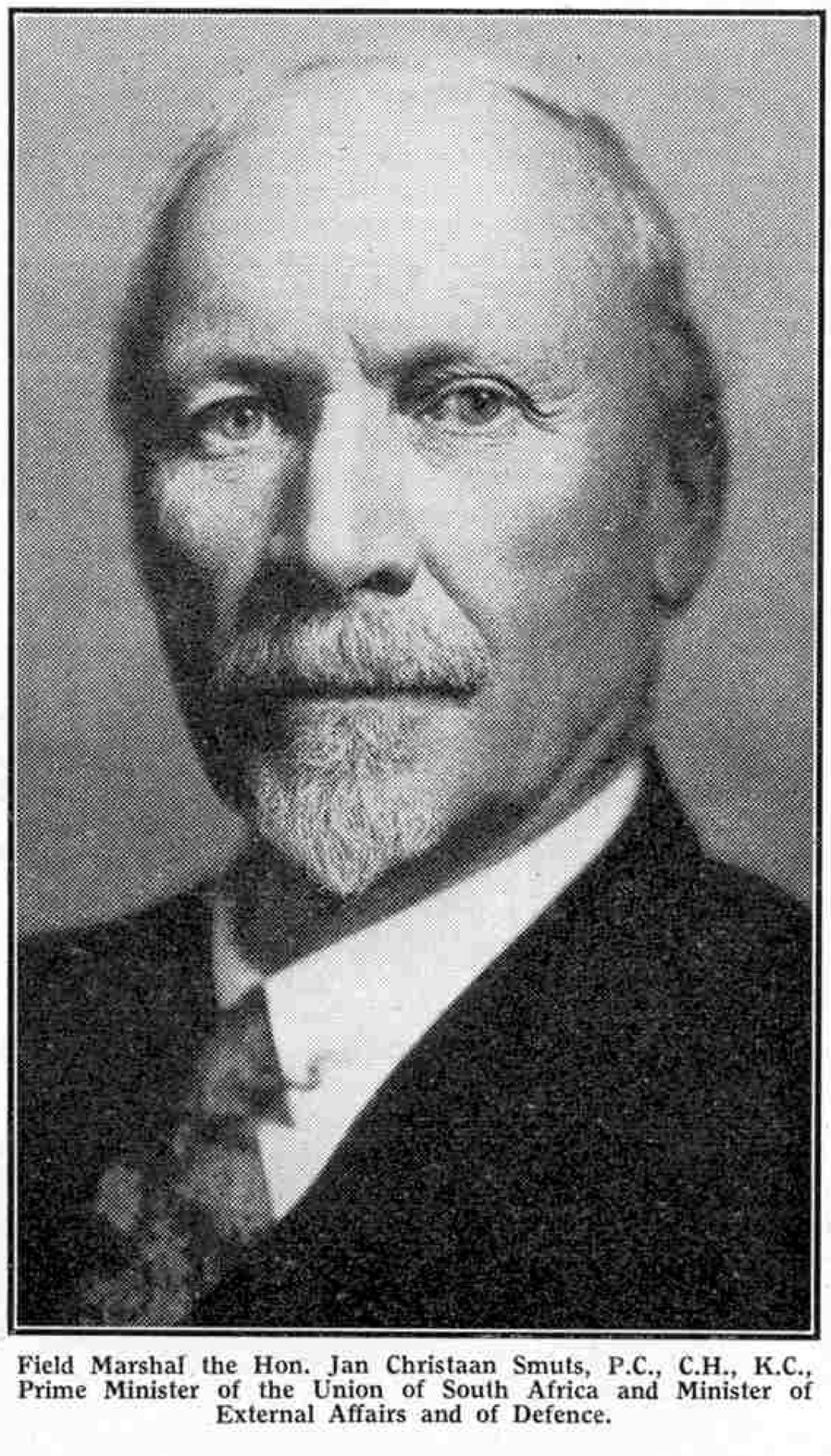
In the past I have always regarded a loaf of bread as the most uninteresting-looking thing on earth. Since reading Mr. T. R. Robinson's article *"Loaves by the Thousand"* on page 334 of this issue, however, I have gazed upon the placid "two-pounder" with new respect. The extent to which mechanisation has been carried in a large modern bakery is really astonishing, all the more so because its development has taken place quite unknown to the vast majority of people. This is not all, however, for the milling of the flour from which the bread is made is itself a triumph of mechanisation; and further back still in the story, the development of wheat-growing to its present state is the result of intensive scientific research and the application of machinery on an enormous scale.

To pass to material of a somewhat different texture, this month's cover article shows how concrete has made it possible to harness a great river and to obtain from it light and power in vast quantities by building huge dams. Norris Dam, the great American structure described in this article, is part of a plan to control the Tennessee River.

Engineers and Fishes

Next month another vast scheme of this kind will be described, this one concerned with a great waterway on the Pacific coast. A feature of this article that readers will find of particular interest is the account of the elaborate measures that have been taken to provide for the safety and comfort of salmon and other fish that pass up and down the waterway, whose domestic affairs otherwise might have been seriously disturbed by the engineering works.

For aircraft enthusiasts I shall have something particularly good next month in the shape of an article on *"This Bombing Business,"* by C. G. Grey, founder and late editor of *"The Aeroplane."*



Field Marshal the Hon. Jan Christaan Smuts, P.C., C.H., K.C., Prime Minister of the Union of South Africa and Minister of External Affairs and of Defence.

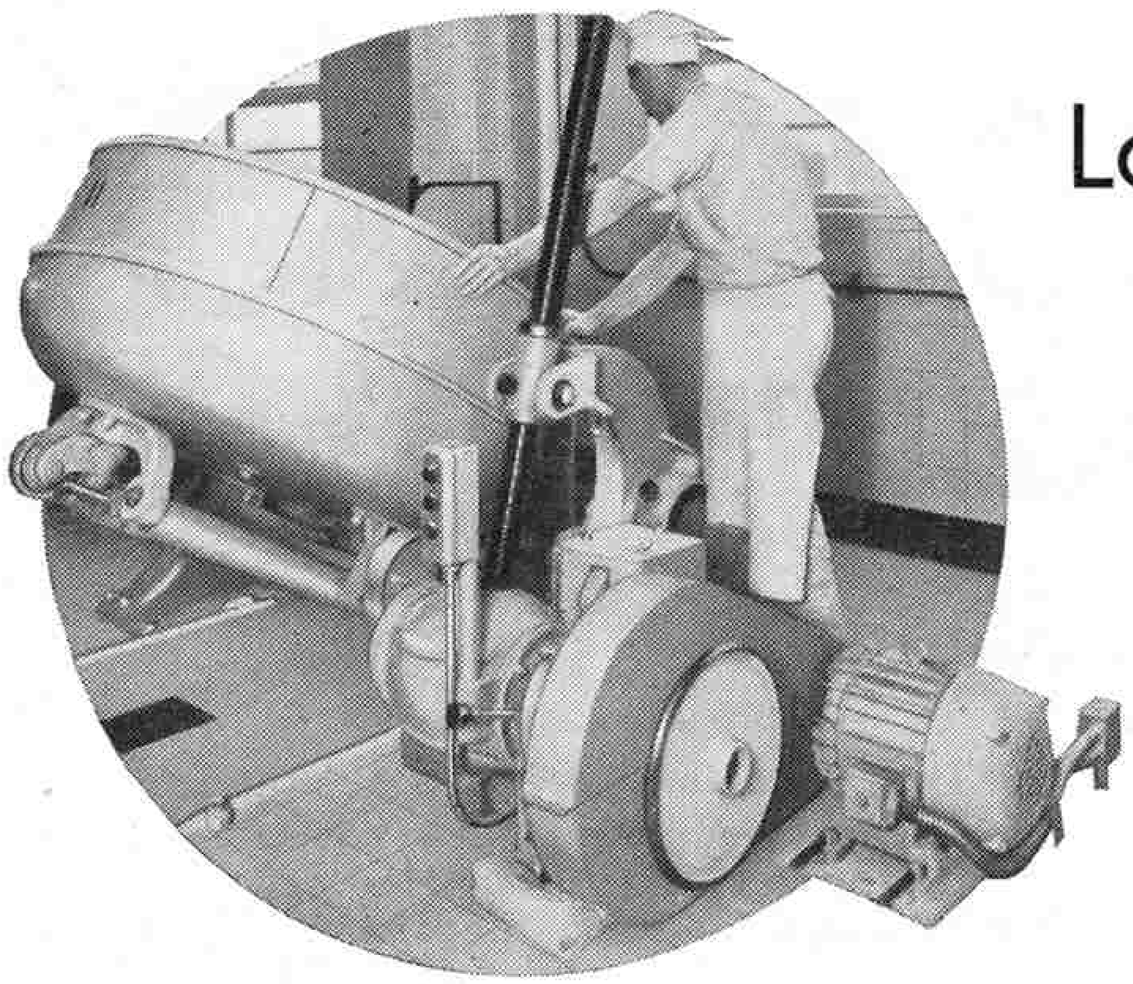
Leaders in the War

XXIV.—Field Marshal the Rt. Hon. J. C. Smuts

Jan Christaan Smuts was born in 1870 in Cape Colony, South Africa, of Boer parentage. He was educated at Victoria College, Stellenbosch, South Africa, and at Cambridge. In 1896 he settled in Johannesburg and practised at the Transvaal Bar, and two years later President Kruger appointed him State Attorney of the South African republic. In the Boer War he fought with the Boer field forces and was their commander-in-chief in the Cape. In 1902 General Louis Botha summoned him to a conference at Vereeniging that ended the war, and he became a loyal supporter of Botha's policy of co-operation with the British. The granting of self-government to the Transvaal and the Orange Free State owed much to Smuts' visit to England in 1906, and he was Minister of the Interior in the first Transvaal government formed in 1907. He was prominent in the events that brought about the union of South African colonies, and held the triple offices of Minister of the Interior, Mines, and of Defence, in the first South African government, set up in 1910.

In the war of 1914-18 Smuts played an important part, and eventually took over the chief command in East Africa. After the death of Botha in 1919 Smuts became Prime Minister of South Africa, but resigned in 1924 when the Nationalist Party led by General Hertzog came into power. On the outbreak of the present war Hertzog resigned and Smuts succeeded him, becoming Prime Minister and Minister of External Affairs and of Defence. In May this year the King appointed him a Field Marshal in the British Army, a worthy honour for this great soldier and statesman.

Field Marshal Smuts ranks high among the world figures of to-day, and his speeches since war broke out have had an inspiring effect not only in his own country but throughout the Empire.



Dough tipping machine.

Loaves by the Thousand

A Modern Bakery

By T. R. Robinson

A LARGE modern bakery is a most interesting place to see, for its wonderfully constructed plant is carrying out the simple bread making and baking processes that have been done for centuries, but is performing them in an efficient and mechanised manner. How far mechanisation has been carried is shown in the following description of an up-to-date bakery "somewhere in London," which produces loaves by the thousand.

The loads of flour that arrive at the bakery are rapidly handled and transferred to an electrically-driven elevator, which forms the link between the unloading bank and the flour loft on the top floor. The lorry backs up to the lower end of this elevator, and one by one the bags are placed on a series of platforms mounted on an endless conveyor-chain, which moves round in a vertical chute erected against the wall of the bakery.

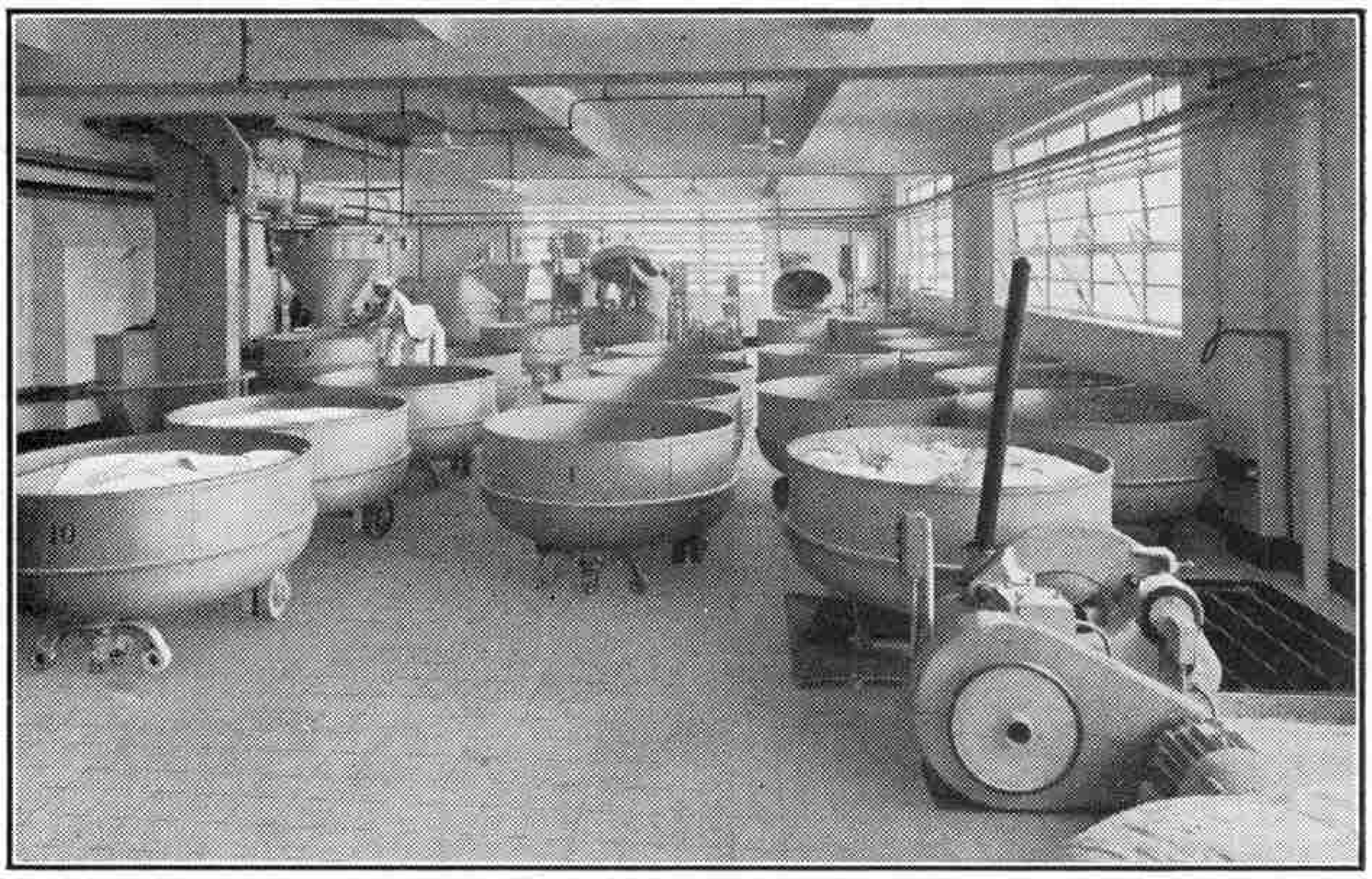
By this means the bags are raised to the top floor of the building, and they are then tipped on to a broad conveyor belt traversing the whole length of the flour loft. Spanning this conveyor belt is a deflector, or "stripper," which crosses the width of the belt at an angle, and can be moved along to any desired point. As the movement of the belt carries the bags of flour against the stripper, the angle of the latter causes them to be delivered on to the shoulders of the man who is stacking the flour; and by adjusting the position of the stripper the bags can be deflected at any convenient point. This greatly eases the work of stacking, and allows a large number of bags to be dealt with in an hour.

The flour loft is a long, light room, in which the bags are stacked in regular groups. Its low ceiling has a double purpose. The height from floor to ceiling is such that it is impossible for any part of the floor to be overloaded; although there is an ample margin of strength, this limited head-room acts as a further precaution. In addition, the low ceiling assists in the maintenance of an even temperature, a thing of great importance in flour storage. When the loft is full it holds about 4,000 bags under perfect conditions.

When flour is being drawn from the loft for bread making, batches of bags, taken from various stacks are tipped through a flour-shoot in the wall of the loft. The bags are selected to give the blend of flour required for the particular sort of bread that is to be made, and different blends are employed for various kinds of loaves.

Falling down the shoot, the flour passes through a fine sieve and then drops into a series of pockets of a chain-conveyor, very much like the bucket chain of a dredger. The chain conveyor carries the flour downward to the next floor, and discharges it on to another conveyor moving horizontally across to the hopper of the "blender." This machine thoroughly blends the selected flours that have been shot down from the loft above, and then tips out the exact weight of the blended flour required for one mixing of dough into one of a series of large metal bowls, which are wheeled in turn beneath the lower end of the blending hopper. The bakery is one of the few to be equipped with this combined blending and weighing plant.

When the dough bowl has received its load of flour, it has a quantity of salt added. It is then wheeled to one of the large dough-mixing machines and placed in position on a rotating table that is at floor level. A measured quantity of temperate water from an electrically-heated plant is then added: this water contains an appropriate quantity of yeast, which the plant mixes in.



The dough room. The machine that blends and weighs the flour is on the left, and the dough mixing machines are at the far end of the room. On the right is a tipping machine, which tilts up the bowl to empty the risen dough on to a grid over the hopper leading to the dividing machines.

The mixture of yeast and water is led from the plant to the correct points on the dough mixing machines by channels, which add it as the bowl slowly rotates; and in the meantime a mixing arm with a T-shaped end is moved in the bowl in a combined up-and-down and backward-and forward direction by a crankshaft and levers. This copies the movement of the hands and arms of a skilled baker so well that in from 12 to 15 min. the flour and other ingredients in the bowl are kneaded and mixed into a consistent and even mass of dough. When the bakery is at work all the dough-mixing machines are kept continuously employed, and a further smaller mixer is also provided to deal with the dough for currant and milk bread.

When the mixing and kneading has been completed the bowl is wheeled away to an open space on the dough-room floor. There, after it has been covered with a sterilised cloth, it is stood aside for 3½ hrs. to allow the dough to rise. The steady increase in the size of the mass of dough is quite fascinating to watch, and is one of the most important processes in the production of a perfect loaf. There are 30 dough bowls in use at the bakery. each being numbered and used in strict rotation, so that there is no chance of dough that has not had sufficient time to rise being passed on to the next process.

When the rising period is complete the bowls are wheeled to one or other of two electric tippers in a corner of the dough room. Here, as with the mixing machine, the bowls are clamped to the machine, but in this case the frame to which the bowls are attached is tilted by an arm ending in a screwed collar. This collar runs

on the thread of a rotating vertical shaft driven by an electric motor, and as the shaft turns the collar rises and tips up the bowl of dough, emptying it out on to a grid placed over a hopper opening in the floor. The tipping is controlled by a three-push control switch, the first touch tipping the bowl half-way, the second emptying it completely, and the third returning the bowl to its original position, ready for removal.

As the dough falls the grid breaks it up and prevents it from reaching the bottom of the hopper in one large unbroken lump. At the bottom of the hopper the dough is controlled by an adjustable regulating slide, much like a small sluice-gate, and the rack and pinion that operates this governs the flow of dough into the dividing machine.

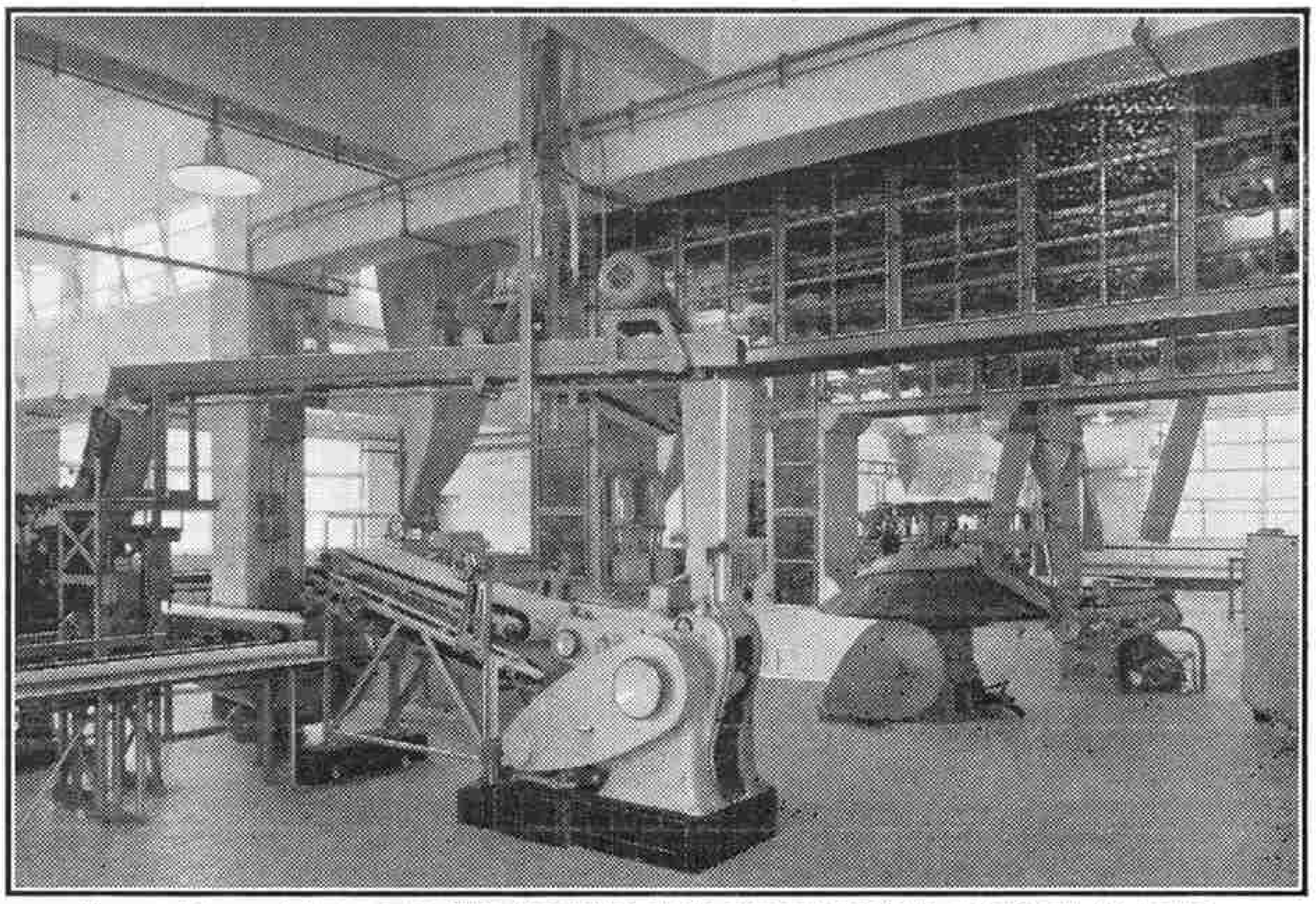
The dividing machines, of which the bakery has two, are remarkable pieces of mechanism, for they carry out the work of splitting up the streams of dough that emerge from the hoppers of the dough-shoots into the separate pieces necessary for individual loaves, and also do some of the first moulding processes in a manner that seems almost human. The dough is fed against steel rollers, each of which has two pairs of pockets formed in it at diametrically opposite points. Each pocket holds enough dough for one loaf, and the rollers rotate a half-turn at a time, pausing for a short time between each movement. During the pause, the two pockets that have stopped opposite the feeding channel of the divider are filled with dough, and the next movement of the roller cuts off the two pieces and moves them round to a point where they are ejected into two steel boxes.

As the pieces of dough enter these boxes, revolving steel "probes" are inserted into them, and the action of these is to "work" or rotate the dough, setting free any gases that may have formed in the interior of the pieces. The probes are then withdrawn, and the pieces fall into a chain of linen baskets that are passing along below the boxes. These baskets are linked together in an endless chain, and their speed of travel is set so that each pair passes under the boxes at just the right moment to receive the pieces of dough. While these pieces are being ejected, probed and dropped into their baskets, another two pockets in the rollers are being filled with dough, and so the action goes on automatically and continuously.

The movement of the endless chain of baskets carrying the pieces of dough takes them on a series of backward and forward paths through a glass-walled compartment known as the "first prover," and the time taken to complete the journey is from 12 to 15 min. During this time the pieces settle down and recover from the treatment that they unavoidably receive in the divider.

As each piece of dough emerges from the prover, its basket is tipped out on a conveyor-belt that takes it to the next stage of its journey towards the oven. Up to this point the dough for most forms of loaves receives the same treatment, but this last conveyor is so arranged that dough passing along it can be diverted as required to one or other of several alternative moulding processes. One of these is for tin loaves, and dough for these goes to the "tin shape moulder." In this machine each piece of dough is gripped by a four-sided knife that is inserted sideways into it and then revolves it, shaping it into a cylinder.

When this is done the knife is automatically withdrawn and the piece of dough falls on a rapidly moving belt that carries it up and under another belt moving in the opposite direction at a different speed. The action of these two belts is to give a further moulding to the dough, and as this is completed, more conveyors transfer the pieces of dough to the final prover, where they are dropped into tins.

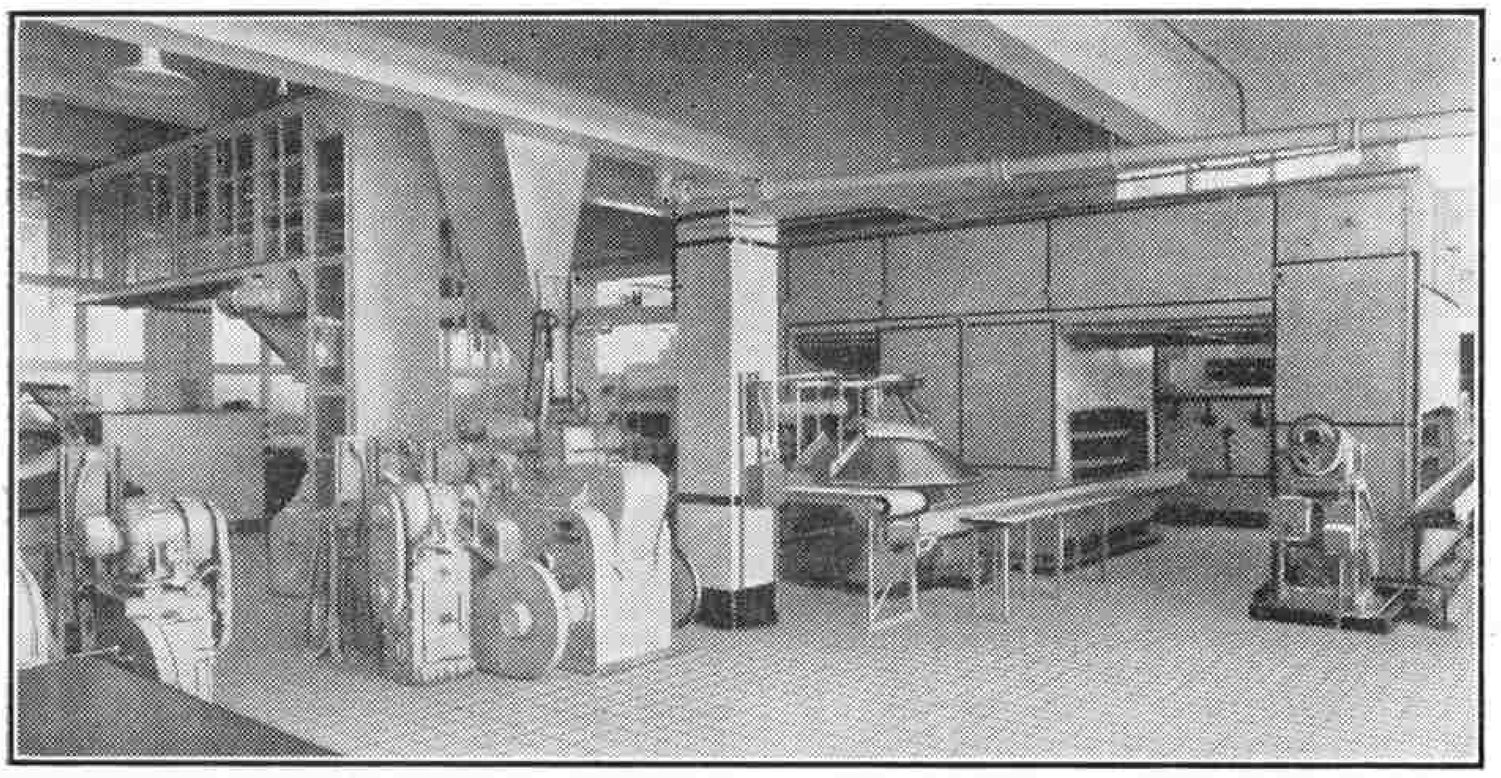


The moulders and first prover. This illustration shows moulders for both cottage and tin loaves.

The dough-filled tins are next placed on a row of shelves which are really another conveyor, and on these they move slowly through the prover, the journey taking about 35 min. The prover is heated, and the dough gains heat as it passes through, thus preparing it for its entry to the baking oven.

Other types of loaves call for slightly different treatment of the dough. There is a special moulder for long loaves, and another for coburg or cottage loaves. This last type is known as an "umbrella" moulder, for the reason that its moulding table is shaped rather like a flattish umbrella. The purpose of this peculiar form is that the dough needs to be moulded rapidly at the start of the process, and then more slowly as it nears completion. The umbrella moulder does this by moulding the dough at first on the edge of the table, which has a large diameter, and then by means of guiding channels moving it up and nearer the centre as the work proceeds. The dough is then travelling over a smaller distance during each rotation of the table, and so the speed of moulding is gradually decreased. If cottage loaves are being made, an extra knife-blade attachment divides each piece into two sections as the table turns, and these are then moulded separately and finally put together to form the familiar cottage shape.

Meanwhile the bread that has been passing through the final prover has reached the large oven. This "travelling" oven, as it is called, is really another stage in the chain of conveyors that keep the dough constantly in motion from the time it leaves the divider until it emerges as a finished loaf, but it is also a wonderful feature of the bakery. Unbaked loaves from the prover are placed in rows on the "oven-bottom," which is made up of a series of shelf-shaped sections, each about a foot in depth and as wide as the oven itself. These *(Continued on page 363)*



Dough dividers and moulders, with provers on left and right. The "Umbrella" moulder, which shapes cottage loaves, is beside the pillar in the centre.

Concrete for Giant Dams

SINCE the coming of the Electrical Age, engineers in all parts of the world have endeavoured to make the utmost use of waterfalls and rivers for the production of light and power. Where a waterfall is concerned the power house is built at the foot and the water in its fall to that level acquires the power to turn the turbines and generators. In other cases the height is created artificially by building a dam across the course of a stream to form a lake or reservoir. The material chiefly employed by the engineer for this purpose is concrete, the basis of which is Portland cement, invented about 1811 by Joseph Aspdin, a Leeds bricklayer. This is a mixture of chalk and clay burned and ground to a fine powder. When it is mixed with water it sets to a rock-like mass, which gets its name from its likeness to the hard durable stone quarried at Portland.

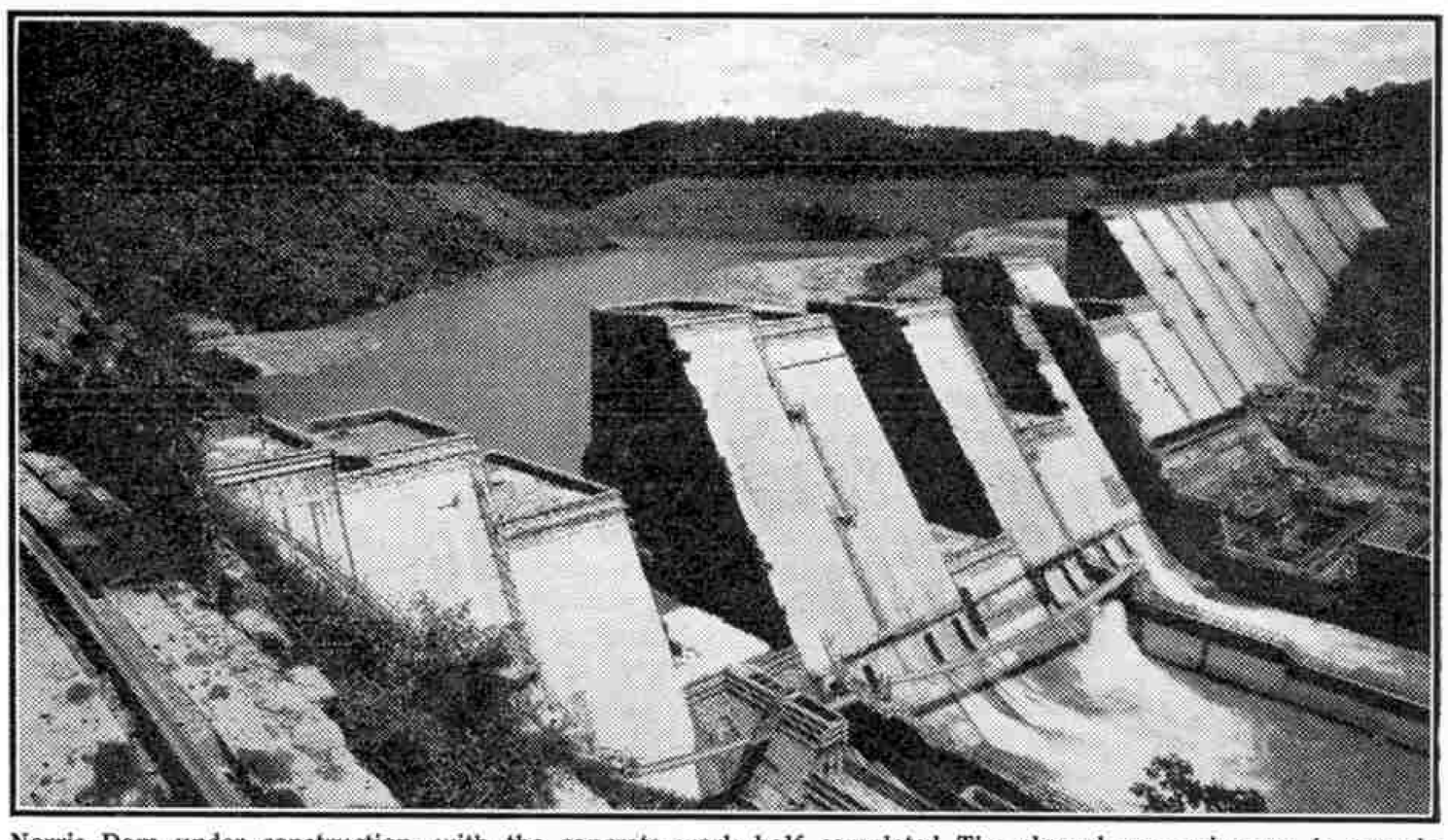
Cement to-day is made by a process similar in all respects to that used by its discoverer, but vastly more powerful and ingenious machinery is employed, and the operation is carried out on a gigantic scale. Chalk or limestone is the most important ingredient, and for this reason, cement works usually are situated near abundant supplies of these materials. Clay is added and the two materials are washed and pulverised until they form a slushy mixture known as slurry. This is passed through a fine screen and is then pumped into huge storage and mixing tanks, where it is continually stirred. From there it is fed into giant rotary kilns, and as it passes through the long cylinders of these kilns it is first dried and then heated more strongly, the temperature at the lower or firing end being about 2,800 deg. F. The burnt mixture is ground and stored.

The conversion of Portland cement into concrete is a comparatively simple business. Mixing it with sand and water gives a hard and durable mortar, and concrete for building purposes is made by adding also broken stone, the pieces of which are rounded so that they can slip past each other easily. The spaces between the stones are filled with smaller stones and sand, and wet cement envelops all of them. Thorough mixing, usually in machines with rotating pans, ensures that the mixture is uniform, and on setting it becomes a hard solid mass. Wooden forms are used to give it shape and the concrete is well tamped down to avoid leaving holes, or "voids," as the engineer calls them.

Although the idea is simple, elaborate machinery is necessary to produce concrete in the large quantities required for huge dams, and the greatest care must be taken to find stone and sand of suitable quality, and to use the three materials in the best proportions. A common mixture is six parts of stone and three of sand to one of cement. A much stronger concrete contains four parts of stone and two of sand to one of cement, with stones not exceeding 3 in. in size. Yet another mixture, for concrete that is to be used under water, as for instance in the making of piles for the support of dock or harbour works, contains one part each of cement and sand, with two parts of broken stone.

Our cover this month, which is based on a photograph for which we are indebted to the Tennessee Valley Authority, shows concreting work in progress during the building of a great dam. This is the Norris Dam, part of great American works built to harness the Tennessee River and its tributaries. The structure is a third of a mile in length, with a height of 265 ft. and a thickness at its base of 208 ft. It holds back the waters of an enormous reservoir that has accumulated behind it, stretching 72 miles up the Clinch River, the tributary of the Tennessee across which it is built, and 56 miles up a second feeder stream. This huge lake holds 836,000 million gallons of water when it is full to the level of the spillway section of the Dam.

One end of Norris Dam is an earth-filled dyke with a reinforced concrete core and a protective covering of stone blocks. The greater part of it however is a solid mass of concrete 1,570 ft. in length. It is impossible to place such an enormous quantity of concrete in a single continuous operation. Instead it is constructed in a series of columns, each of which is built upward in stages above its neighbours, these in turn being built up to overtop it. This continues steadily until the correct level is reached all the way along.



Norris Dam under construction, with the concrete work half completed. The cleared reservoir area is seen in the background, and water is pouring through sluiceway gates at the base of the Dam. Photograph by courtesy of the Tennessee Valley Authority.

The illustration on this page shows the Norris Dam as the sections rose alongside each other. More than a million barrels of cement, 706,612 tons of sand and 1,134,076 tons of crushed stone went into the finished structure, and an elaborate organisation was necessary for bringing these materials to the site, mixing them and delivering them in the form of concrete. The mixing plant was a building of four storeys, the highest of which contained storage bins for crushed stone or "aggregate." The stone required was blasted from the base of a quarry and loaded by electric shovels into trucks that carried it to a series of crushers, between which it travelled on inclined conveyor belts. Four sizes of crushed stone were separated by screening, and the rest of the material was further ground to produce two grades of sand.

In the mixing plant the correct proportions of each grade of aggregate and sand were weighed out automatically and the required quantity of cement was pumped in from a giant steel cylinder with a capacity of 6,000 barrels. There were three tilting mixers, capable of producing from 3,000 to 4,000 cu. yds. of concrete a day, and as each batch was completed it was shot into a truck waiting beneath. In this truck the concrete was carried to a bucket suspended from a cableway crossing the site of the dam. Actually there were two cableways, with cables suspended from steel head and tail towers that could be moved on runways, so that every corner of the dam site could be reached. The cables measured 3 in. across, and each contained 165 strands of special steel wire capable of carrying a load of 18 tons. The full buckets were hoisted up at a speed of 300 ft. per min. and ran along their sky track at 1,200 ft. per min. until they reached the position for the concrete they contained. The bucket was then lowered, dropping down at a speed of 400 ft. a minute, and the hinged doors forming its base were opened to release its contents. The concrete was then worked into position and tamped well down to make sure that no voids were left. During these operations the cableway movements were directed by telephone signals from a man at the point where the concrete was being placed.

There is another reason, besides convenience in operation, for building great masses of concrete in sections. The setting of Portland cement is due to the absorption of water, and the mixture becomes hot during this process. The heat from small structures is radiated quickly enough to prevent serious cracking, but a huge dam would take far too long to cool. For instance, Boulder Dam on the Colorado River, a mass of more than 3,000,000 cu. yds. of concrete, would have taken 125 years to cool naturally if it had been poured in a single block. Instead it was built in 232 great square columns, and even then it was found necessary to cool the concrete artificially by circulating water from the Colorado River and special refrigerating plant through pipes embedded in it.

American Diesel Developments

Power Units for Transcontinental Service

AMONG the most interesting of the train services operated by Diesel locomotives that have been developed to such an amazing degree in the United States in recent years are the transcontinental streamliners respectively known as the *"City of Los Angeles"* and the *"City of San Francisco."* These cover the distance from Chicago to the Pacific Coast in 39¾ hours. The first-named is owned and operated jointly by the Union Pacific and the Chicago and North Western Railroads; the other is owned and operated jointly by the same two systems in conjunction with the Southern Pacific Railroad. Now news is to hand that the existing equipment on these services is to be replaced by 18-car trains of super-modern vehicles; and to haul these giant Diesel-electric power plants have been designed, and at the moment of writing are undergoing tests.

The upper illustration on this page shows the external appearance of the triple unit intended for the *"City of San Francisco"* service. In spite of the tremendous bulk and the impression of enormous power that is conveyed by the general appearance, the slick streamlining characteristic of the design developed by the Union Pacific, a pioneer in this form of motive power, is retained. The colour scheme is striking, canary yellow being the main body shade while the roofs and running gear are finished in what is known as "harbour mist grey." Decorative striping is in red, while the metal embellishments are chromium plated.

These new triple units together form veritable power houses on wheels, the total horsepower of the Diesel engines being 6000, made up by two 1000 h.p. engines on each of the three units forming the complete locomotive. Control and operation of all these engines are synchronised so that the "engineer" in his cab runs all three units as a single locomotive over 209 ft. long, 10 ft. 7 in. wide and 15 ft. high. Each unit runs on two six-wheeled bogie trucks; and of each three pairs of wheels, two pairs are driven by electric motors geared to their axles. The centre pair of wheels in each case are idlers and are for weight-carrying purposes only. Current is applied to the motors, which total 12 in all, from generators connected directly to each of the Diesel engines by means of flexible couplings. There is also in the second and third car of each locomotive an auxiliary engine generator set to provide current for heating in the train.

A power plant on wheels; one of the two new triple-unit 6000 h.p. Diesel-electric streamliners introduced for haulage of 18-car trains between Chicago and the Pacific Coast. Illustrations by courtesy of the Union Pacific Railroad.

Various innovations have been introduced in these locomotives that add to the safety and reliability of operation. One of the headlights, for instance, is a most spectacular affair. It is known as the "Mars" headlight, and throws an oscillating beam that is visible for a quarter of a mile on each side of the track. The headlight has a mechanism that causes the beam to oscillate in the form of a figure eight; the rapid movement of the beam at night arrests attention, and acts as a warning to anyone near the railway or crossing the line. Another headlight throws a powerful beam straight ahead along the track. Further warning devices are a long-distance siren and an electric gong.

The engineman of one of the new locomotives speaks to the train crew by means of the intercommunicating telephone in the cab.

If any of the axle journals and bearings of the train should tend to run hot the fact is indicated automatically by the ringing of an electric bell in the engine cab. Quick detection of the journal in question is made possible by a red light which glows in the vehicle concerned in the event of a "hot box" occurring. On receiving a hot journal alarm the engineer would of course bring the train to a stop. Similarly there is an alarm system that rings a bell in the unit affected if there should be any overheating of the engines; and in the event of any failure of the lubricating oil pressure the engines are stopped automatically by a special control.

The engines themselves are governed by the "dead man's handle" type of control that is usual on electric locomotives and trains. This requires the engineman to keep a hand or foot on the controls; if he fails to do so for any reason the train is brought to a standstill automatically. Train speed is regulated by an electro-pneumatic throttle. This changes the speed of all the Diesel engines simultaneously, and so varies the amount of current supplied in the traction motors.

Operating speeds laid down in certain districts are the subject of a further form of train control. If such speeds should be exceeded, a warning whistle blows in the cab, and unless speed is reduced within a certain time limit the engines are automatically shut down and the train stops.

Communication by a telephone system is possible between the engine cab and the train so that the engineman can talk to other members of the train crew in the rear of the train. The lower illustration on this page shows the telephone in use, and gives a splendid impression of the typical American Diesel engineman.

Braking pressure in relation to train speed is electrically controlled so that there shall be no skidding of the wheels when the brakes are applied. Certainty of brake operation is ensured by the use of a new type of brake combining both electrically operated and pneumatic elements. During brake applications on long down gradients an automatic water spray device comes into operation in order to keep the tyres cool. Braking is assisted by a rail sanding device that comes into operation if there is an emergency application of the brakes. It can be used also at will for any ordinary stop. Sand is delivered ahead of each wheel of each of the three locomotive units.

AIR NEWS

The Latest "Hurricane" Fighter

In its latest form the world-famous Hawker "Hurricane" single-seater fighter is more heavily armed, climbs faster, and has a much higher ceiling than hitherto. It is being produced in two versions. The "Hurricane IIB" is armed with twelve .303 in. Browning machine guns, which have a combined rate of fire of 14,400 rounds per min. and give a total weight of fire of almost 360 lb. per min. The "Hurricane IIC" is even more heavily armed, having four 20 mm. Hispano-Oërlikon cannon instead of machine guns. The total rate of fire of the four cannon is 2,400 rounds per min., and the fire power about 600 lb. of explosive shell per min., which is said to be greater than that of any other single-engined fighter in service to-day.

The more powerful Rolls-Royce "Merlin" engine fitted in the new "Hurricane" has increased the rate of climb and made it possible for the machine to operate at a greater height.

World's Largest Twin-Engined Transport for British Airways

It is reported that British Airways are to acquire the Curtiss CW-20, the largest twin-engined transport aeroplane in the world. A crew has been sent to the United States to undergo a short instruction course at the Curtiss-Wright Corporation plant, and fly the machine to England. The Curtiss CW-20 has a wing span of 108 ft., and carries 36 passengers, a crew of four or five, and 6,000 lb. of mail and freight. It is designed for operating at sub-stratosphere heights. A description of this huge machine and a photograph of it under construction appeared in the May 1940 *"M.M."*

Chief of U.S. Army Air Corps Visits War Zones

General George Brett, Chief of the U.S. Army Air Corps, accompanied by a small staff, is making a detailed study of the requirements of the R.A.F., and of the problems of the maintenance of the American aircraft supplied and the provision of equipment for them. The task is taking him to the main war zones, and he began his extensive tour in September last when he flew from the United States to the Middle East by way of Brazil and West Africa. The General and his staff are flying in one of the latest Consolidated B-24A bombers, the R.A.F. version of which is called the "Liberator."

New Heavy Bombers of the R.A.F.

Some general details have been released of two of the new types of R.A.F. heavy bombers which during recent months have taken part in very successful night air raids on Germany and day raids on France. These are the Short "Stirling" and the Handley Page "Halifax," both 4-engined middle wing monoplanes with a wing span of 99 ft., and gun turrets in the bow and stern.

The "Stirling" was the first of the new heavy bombers to go into action, and, with the exception of the American giant Douglas B-19, there is no aeroplane in the world capable of carrying a greater weight. It carries an enormous load of the biggest bombs, and has a very heavy defensive armament. It is fitted with either four 1,400 h.p. "Bristol" Hercules or four 1,600 h.p. Wright Double-Row "Cyclone" engines. Except in regard to wing span the "Halifax" is slightly smaller than the "Stirling." The Boulton Paul electrically-operated turret in the nose has two guns and that in the stern four guns; and the bomb aimer's position has a transparent projection in the underside of the fuselage nose. The "Halifax" can carry a very heavy load of big bombs.

Proposed American Roadside Landing Areas

An interesting feature of the United States Defence Highway Act, 1941, is provision for spending about £1,400,000 on the construction of auxiliary landing areas for military aircraft. If the idea is carried out these areas, called "flight strips," will be built alongside stretches of road which are sufficiently straight and wide. They would vary in size according to the types of military machines employed in the locality, but would not be less than 3,000 ft. long and 300 ft. wide. The runways to be laid on the flight strips will be from 3,000 to 4,000 ft. long, and at least 150 ft. wide.

Names of New Pan American "Clippers"

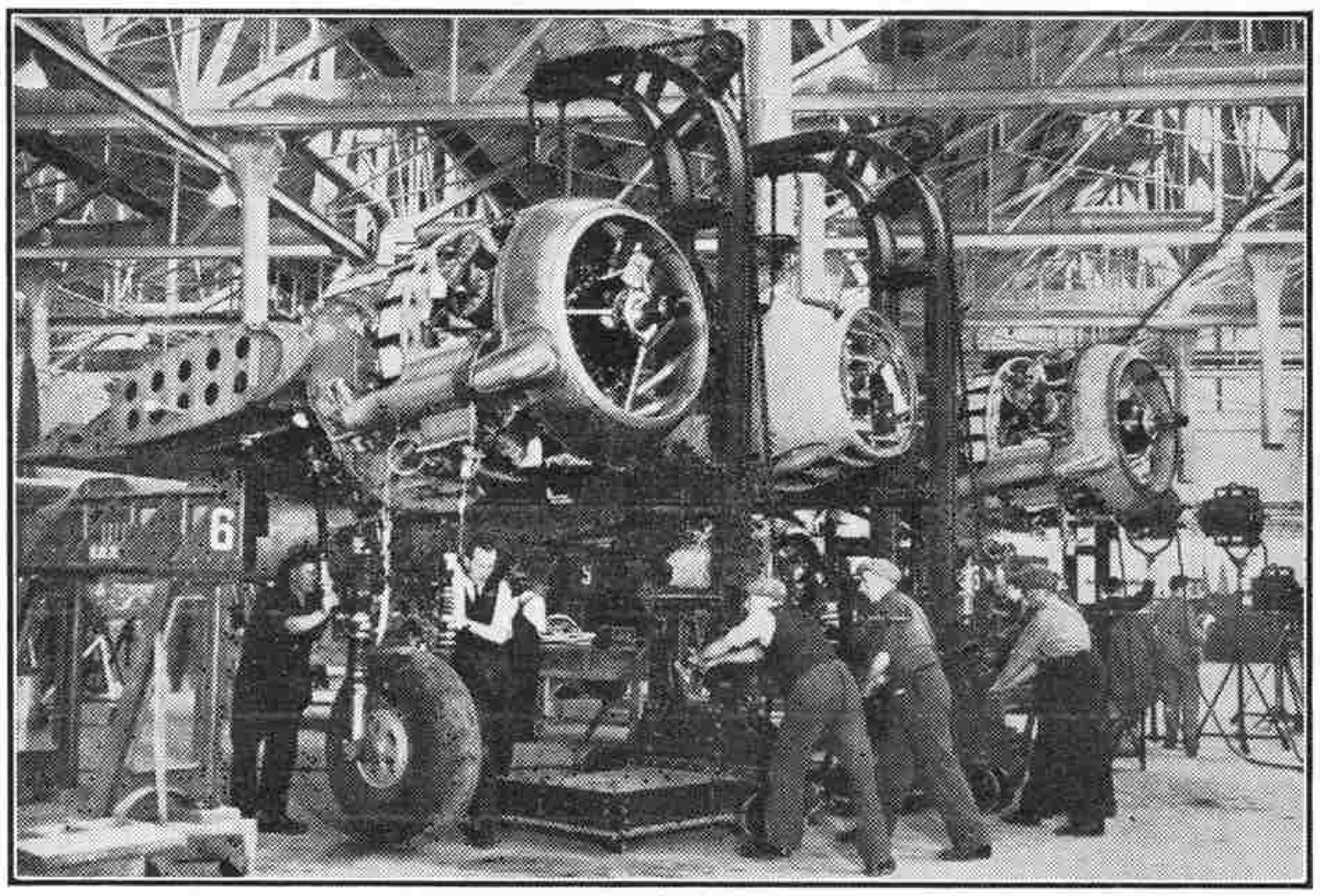
The three new Boeing Model 314A "Clipper" flying boats for Pan American Airways are to be named *"Anzac Clipper," "California Clipper"* and *"Honolulu Clipper"* respectively. They will be employed on the company's trans-Pacific services from Los Angeles to Auckland, New Zealand, and to Singapore, and the original Boeing flying boats at present working the services will then be transferred to the Atlantic route. Two of these older boats at present called *"California Clipper"* and *"Honolulu Clipper"* will be renamed to avoid confusion with the new aircraft.

The schedule under which the Pan American Airways "Clippers" have been operating on alternate weeks to Singapore and Hong-Kong has been revised. Since 1st August last Singapore has been the Far East terminus for all the boats, and a shuttle service is now operated between Manila and Hong-Kong.

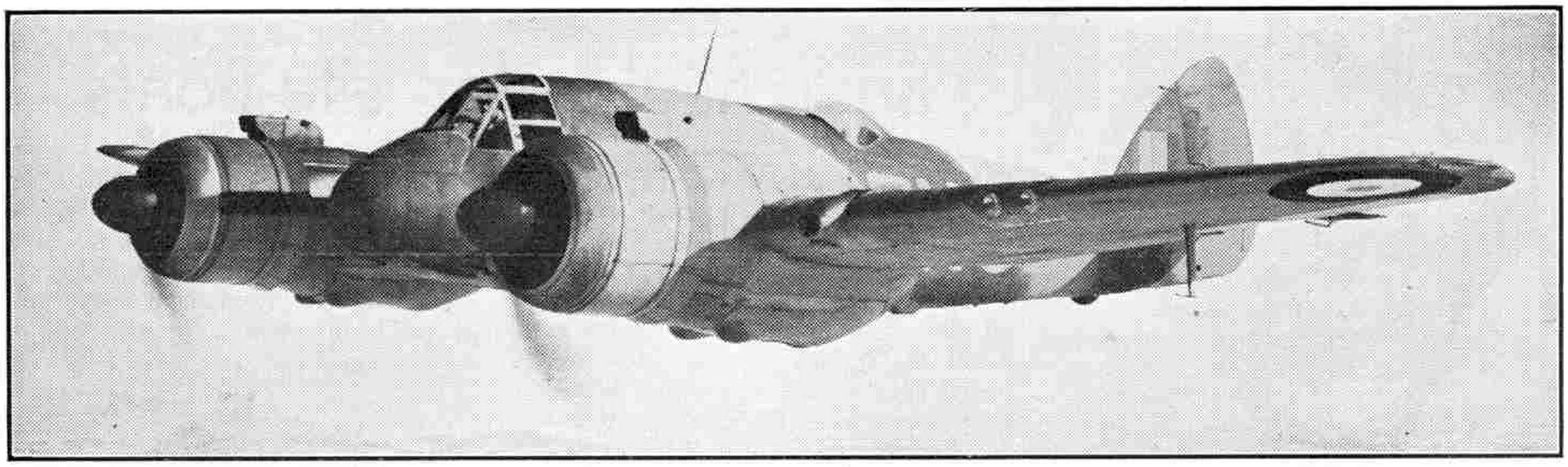
German Boast Repaid

The story of how an unarmed British fighter forced a "Messerschmitt" down in this country is recalled by the recent award of the D.S.O. to the leader of a famous Yorkshire Auxiliary Air Force Squadron. This man had been at Augsburg in the spring of 1939 for the Winter Sports, and while there he had met and been entertained by members of the German Richthofen Squadron. One of the Nazis indulged in a characteristic German boast: "You think your 'Hurricanes' are good, don't you? Well, wait till you meet our 'Messerschmitts'!"

During the Battle of Britain 18 months later the R.A.F. Squadron Leader had the satisfaction of bringing down one of his former hosts without firing a shot. He had run out of ammunition when he encountered an "Me. 109," damaged and endeavouring to escape across the Channel. He closed in upon it, cut off its retreat, and signalled to the pilot to land immediately. The Nazi obeyed, and force-landed in a field with his wheels up. When the two men met later the Squadron Leader recognised the "Messerschmitt" pilot—and reminded him of the Augsburg dinner.



A "Bristol" Beaufighter almost completely assembled being hoisted up out of its jig by a special crane. This photograph and the upper one on the next page are by courtesy of The Bristol Aeroplane Co. Ltd.



A fine photograph of a Beaufighter in flight. This formidable R.A.F. long range fighter has exceptionally powerful armament, and already has scored many successes by day and by night. It has a top speed of more than 330 m.p.h.

South Africans Rebuild Italian Bomber

A Savoia 81, one of Italy's twin-engined bombers, recently arrived at Nairobi after a perfect flight from Addis Ababa, the capital of Abyssinia, where it had been left by the Italians as a wreck. The machine had been badly damaged in South African raids on the capital, and when the South Africans found it hidden under camouflage nets it was wingless and its petrol tanks and tail were holed. The Italians had hammered nails into the engines to add to the destruction.

South African Air Force engineers and the ground staff at Addis Ababa aerodrome set to work on the machine, and with the aid of Italian handbooks reassembled it from parts left behind by the enemy. "A few of us knew Italian slightly and could follow the instructions," said a Flight Sergeant, "but when it came to technical terms we had to use our own judgment. It was a case of trial and error." In three weeks the engineers rebuilt the Savoia and rendered it serviceable. When it landed at Nairobi it had a large white "V" painted on the fuselage.

Several other Italian aircraft have arrived at Nairobi recently on their way to South Africa, where they are to be used for exhibition purposes.

British Airways Staff Losses

British Airways lost two good men by the deaths of Capt. K. D. Garden and First Officer G. L. Panes when an R.A.F. Ferry Command transport aeroplane crashed in a lonely part of the West Coast on 1st September last.

Capt. Garden was an Australian, and much of his flying experience was gained in that country and in New Guinea. He held an Instructor's Licence, and joined Imperial Airways in 1939. First Officer Panes was born at Leigh-on-Mendip, and graduated B.Sc. at Reading University. After being employed as an Air Traffic Control Officer for the Air Ministry, he joined Imperial Airways and served in India and Burma.

De Havilland Mobile School

During the past five years de Havilland Aircraft Ltd. have maintained a school for instruction in the working of their variable pitch airscrews. At first there were only 10 or 12 pupils a week, but now the attendance is about 60, the majority of them members of the R.A.F. In order to cope more readily with the great demand for this instruction the company have fitted out a motor vehicle as a school. It is visiting units of the R.A.F. all over the country.

Unruly Mascots

A goat is not always an entirely happy choice as mascot for a Royal Air Force Squadron, but nevertheless these animals continue to be adopted. In some cases they appear to adopt the squadron, and defying all efforts to dissolve the connection they insist upon active service, without the least intention of submitting to military discipline. One of these goats disappeared in mysterious circumstances after having chewed-up almost every non-metallic object at the R.A.F. station. Its record time for biting through its stake rope was 4 min. 13 sec., and one morning its breakfast consisted of three respirators complete with haversacks!

Aeroplane Detection of Power Line Faults

In the United States the Montano Power Company are using a 2-seater "Cub" training aeroplane to patrol from the air their portion of the new Montana, Idaho, and Utah power transmission line. The portion concerned is about 126 miles long, from Anaconda sub-station to the Montana and Idaho line, and is across hilly territory. By flying as low as 300 ft. above the power cables and not faster than 300 m.p.h. the pilot is able to detect major defects in the line. When he observes any such fault he flies to the nearest landing field and reports the trouble to the company. Patrolling the transmission line by surface means would require several men and a motor lorry.

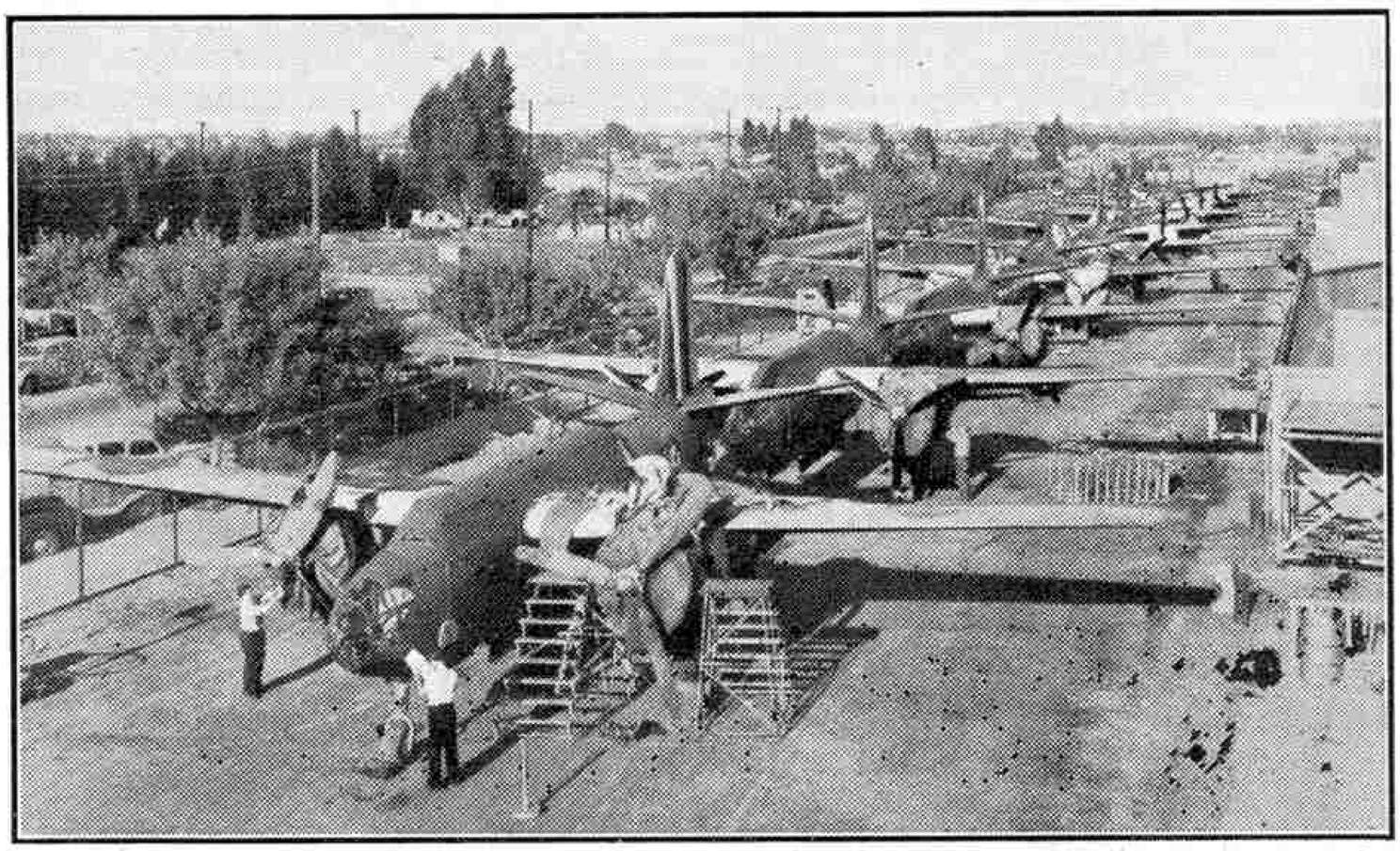
Three Times Across Atlantic to Join R.A.F.

A young American from Chicago now training as a pilot at an R.A.F. Service Flying Training School tried for over a year to reach England from America to get into the war. He was in New York when he decided to join the R.A.F., and he "hitch-hiked" to New Orleans, obtained seaman's papers and signed on as a Canadian deck hand in a Norwegian tanker, bound for Havre. The Havre police would not let him ashore, and he had to recross the Atlantic to Venezuela, where the ship took on oil cargo and sailed for Toulon. While the tanker was lying in Toulon harbour, Italy entered the war and France collapsed. The Norwegian captain ran his ship across the Mediterranean to Oran, where the crew had a "quayside view" of the action by the British Navy.

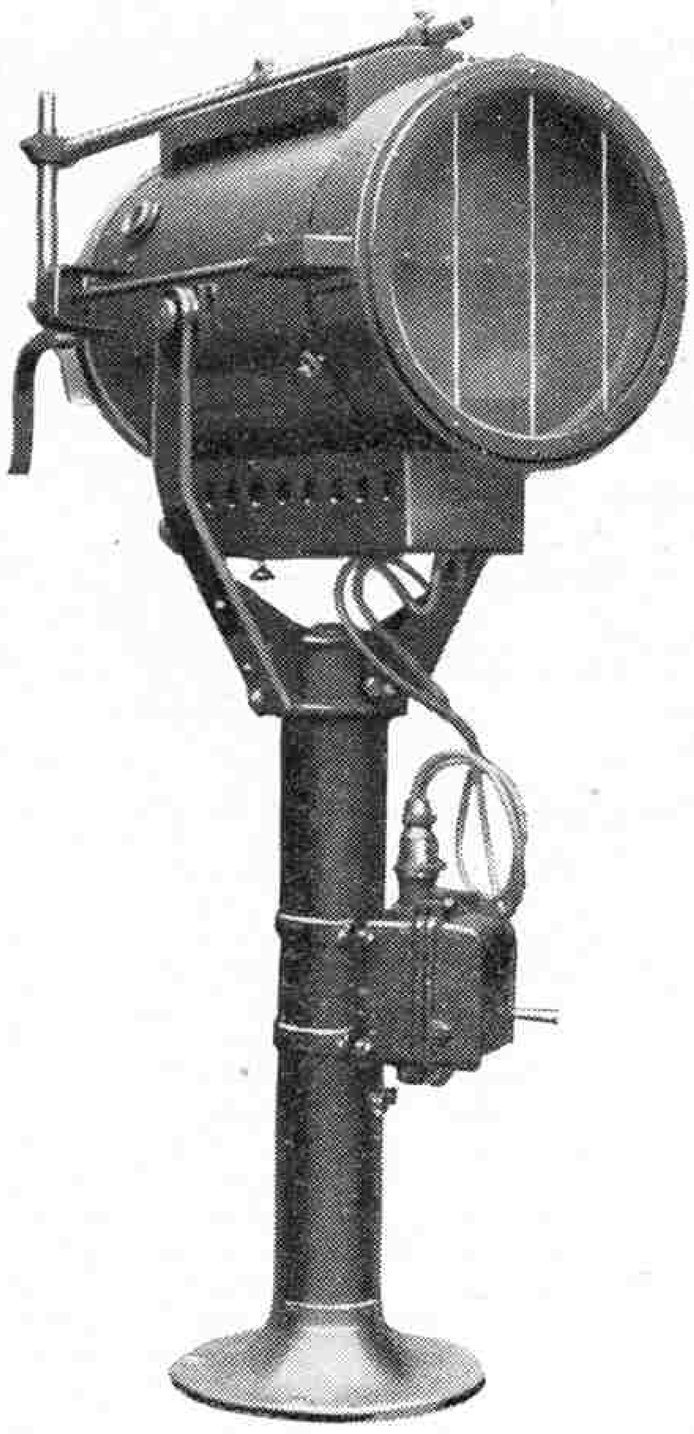
The American "jumped ship" at Oran, made his way to Algiers and Casablanca, and after being held up there for months was repatriated as a "Canadian" by trawler to Gibraltar. There he secured passage to England, and arriving in this country at last achieved his purpose by being accepted for flying duties in the R.A.F.

* * * *

About 200 American air pilots have gone to China to reorganise the Air Force of that country, and to give both flying and ground instruction. The party is believed to include both ex-U.S. Army Air Corps and civil pilots.



Douglas "Boston" twin-engined bombers for the R.A.F. in advanced stages of construction. Photograph by courtesy of Douglas Aircraft Company, Inc., U.S.A.



Medium size signalling searchlight.

Searchlights for Life-Boats

IN the happy days before the war of 1914-18 we associated searchlights almost entirely with warships. Land searchlights may be said to have come into their own during that war when they became necessary to deal with the German Zeppelin and aeroplane attacks. The present war has made the anti-aircraft searchlight all too familiar.

The source of light in the early searchlights was the electric arc discovered by the great English scientist Sir Humphry Davy. In 1802, while carrying out experiments at the Royal Institution, London, Davy found that if two rods of carbon, one connected to each terminal of his great battery of 2,000 cells, were first brought into contact and then separated, a brilliant arch or arc of light was formed between them. The electric arc is still largely employed for the bigger searchlights, but recently filament lamps of special type have come into use.

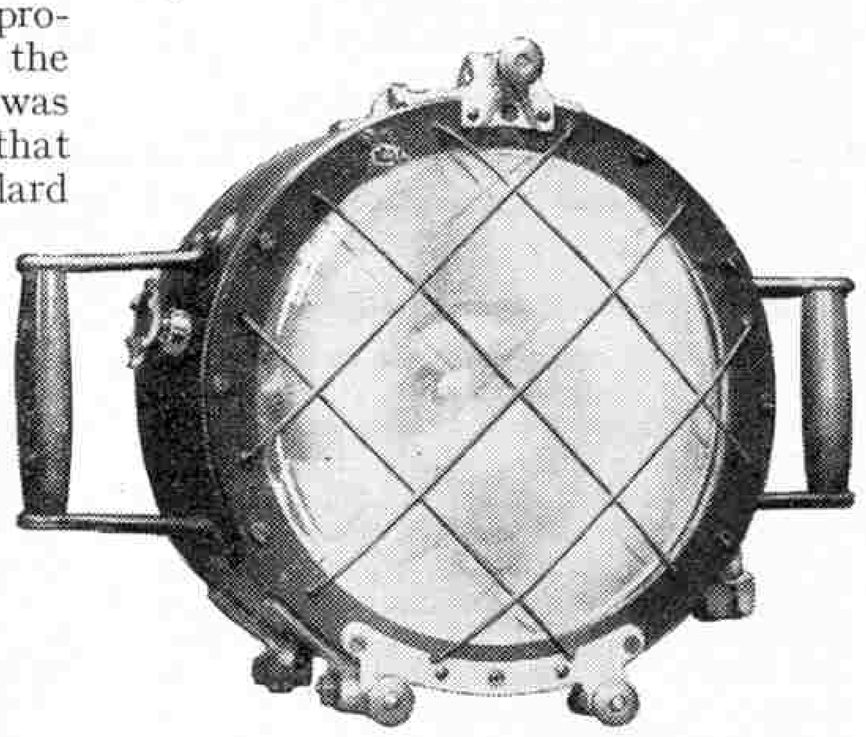
In this article we are concerned with the smaller types of searchlight that are used with motor craft.

Much of the splendid work of the Royal National Life-Boat Institution is carried out during the night. The task of the crews, difficult enough in rough seas even in the daytime, is rendered far more hazardous in darkness, and during recent years a searchlight has become part of the essential equipment of the R.N.L.I. motor boats. The London Electric Firm, long famous for searchlights of all descriptions up to as much as 3,500,000,000 candle power, have produced a type specially suited to the particular needs of the service. It was developed from a 9 in. searchlight that was originally one of the standard searchlight projectors for motor boats. A slightly modified model was produced and tried out on the occasion of a wreck on a bleak night off our south-west coast. The wreck was approached, and with the aid of the searchlight the crew were seen to be clinging to the mast and spars, the hull having been submerged. A successful rescue resulted, which might have been impossible without the aid of suitable illumination. This rescue led to the further development of the searchlight for life-boat work.

The original model was weather-proof, but not water-tight. Owing to the strenuous conditions that frequently prevailed it was found that a watertight equipment was essential; and the various improvements introduced incorporated watertight front and back frames, and tight gland entries for the operating (focusing) spindle and the electric cable. It was found desirable also to depart from the old idea of mounting a searchlight on a pedestal in trunnions for giving horizontal and vertical movements. Owing to the comparatively rapid movements of a life-boat, better results were obtained with a lightweight lantern with suitable handles, that could be held by the operator pressed against the body, and the light thus easily directed on to the objective.

Life-boat type searchlight.

The searchlight is constructed largely of aluminium suitably protected against corrosion, and every component has been specially designed to withstand hard usage and give efficient results. For the sake of lightness and general convenience a metal mirror or reflector is employed, and in the original models this was silverplated. Silver, however, even in a tightly sealed lantern, deteriorates at sea, and chromium plating was next tried. This gave fairly good service, but more recently the original silver-plated mirrors have been revived and finished with rhodium plating, which turns the silvered surface into stainless silver that stands up very well indeed, and gives a highly effective reflecting surface. A low voltage compressed filament lamp placed in the focus of the mirror is the illuminant usually used, and it is rarely necessary to employ a wattage higher than 48 or 60.



Watertight hand searchlight for life-boats. For the illustrations on this page we are indebted to the London Electric Firm, Croydon.

For the searchlights used in conformity with the Board of Trade regulations as part of the equipment of ship's life-boats a more normal form of construction is usual, the lanterns being fitted with either parabolic glass or metal reflectors, and a somewhat higher wattage, 80 or 100, generally used.

It is sometimes desired to use a life-boat searchlight for signalling, and a quick-acting trigger-operated Venetian signalling shutter has been designed to fit over the front of the projector casing, by means of which messages in Morse can be transmitted as may be necessary over a considerable distance either by night or by day.

Photography

Making Figures for "Table-Topping"

TABLE-TOP photography is becoming ever more popular as a pastime for winter evenings, and certainly there is no more pleasant method of passing away a few hours. We have dealt with this branch of photography in previous issues of the *"M.M."*, and have described the simple materials required and methods of arranging suitable lighting. Most of the materials needed are ready to hand in almost all homes, and it only requires a little skill and inventiveness on the part of the photographer to build up very realistic and charming scenes.

The effectiveness and realism of a table-top photograph depend largely on the use of suitable miniature figures of people and animals, and this month we give a few suggestions regarding the best methods of making such figures. In this connection it is important to remember that the most realistic figures are not necessarily the most elaborate; indeed, the reverse is generally the case.

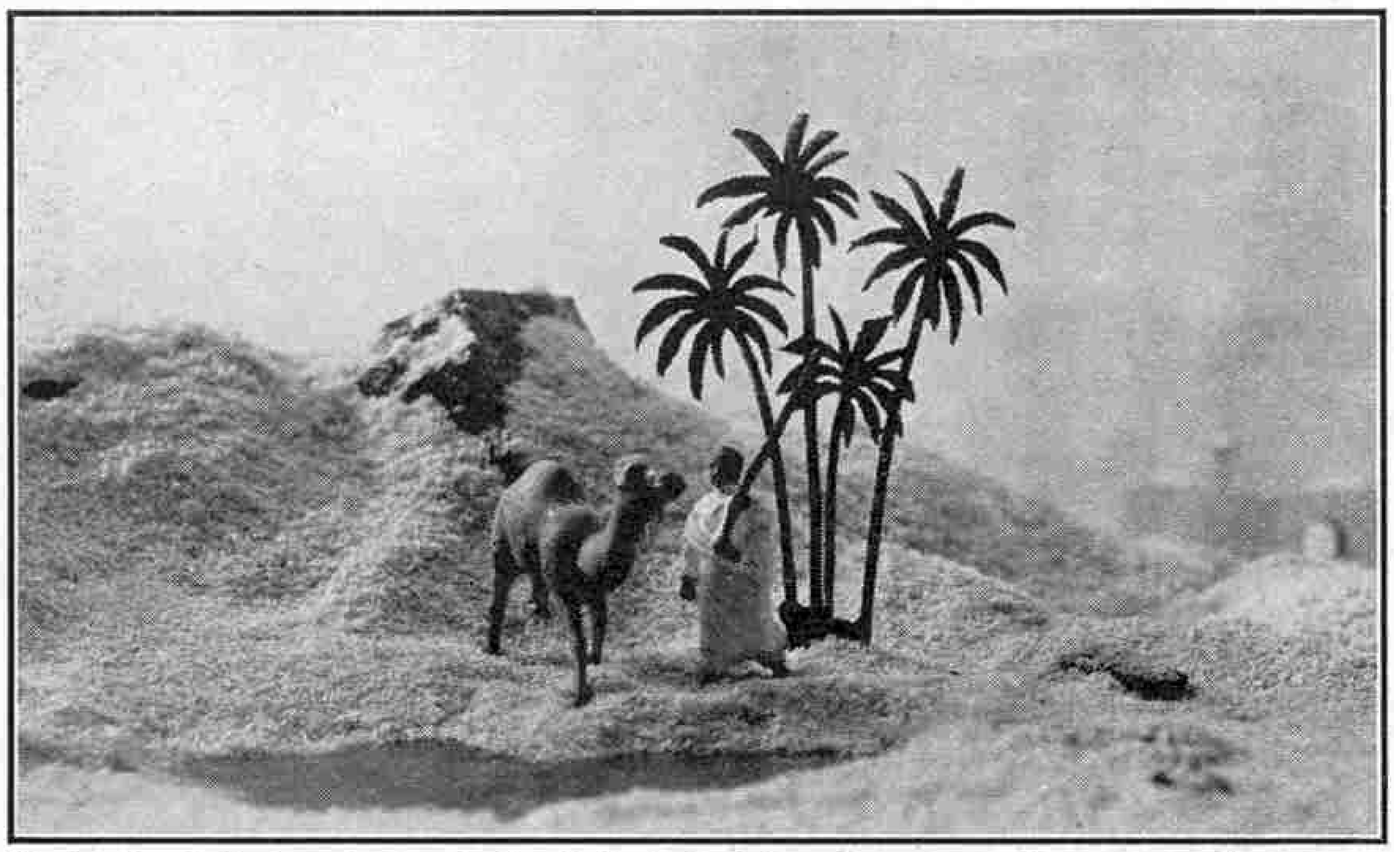
The easiest course is to use small dolls or china ornamental figures, of which most homes can provide two or three examples. Small china figures were used in the picture *"A New Tale of Old Japan"* that appears on this page, and that illustration gives a good idea of the excellent effects obtainable by this means.

Glazed figures sometimes give trouble on account of reflections. This trouble can be overcome by wiping the figures with glycerine and then dusting them with some kind of powder, such as ordinary face powder. The figures can be dressed very effectively with crepe paper of various colours, or unwanted scraps of silk and other fabrics.

Many homes contain tiny carved figures that are particularly realistic, and these are often good enough to justify the planning of a special scene to set them off to advantage. "Table-toppers" should be on the look-out for such figures, and when one is found a good scene in which it can be incorporated should be arranged.

The greatest pleasure from "table-topping," however, is obtained if the photographer makes up all the figures he requires himself. One of the most useful materials for this purpose is ordinary candle wax. This can be moulded to any required shape when slightly softened by warming it in an oven or near a fire, and features can then be carved out with a fine-pointed penknife. Pipe cleaners, corks, pins and matchsticks are other materials—the first and last now, unfortunately scarce—that can be put to good use in making amusing figures.

"A New Tale of Old Japan." A fine table-top photograph by A. G. Dell, London S.E.27.



"A desert oasis." A good example of a "table-top" photograph arranged with sawdust, pieces of rock and toy figures.

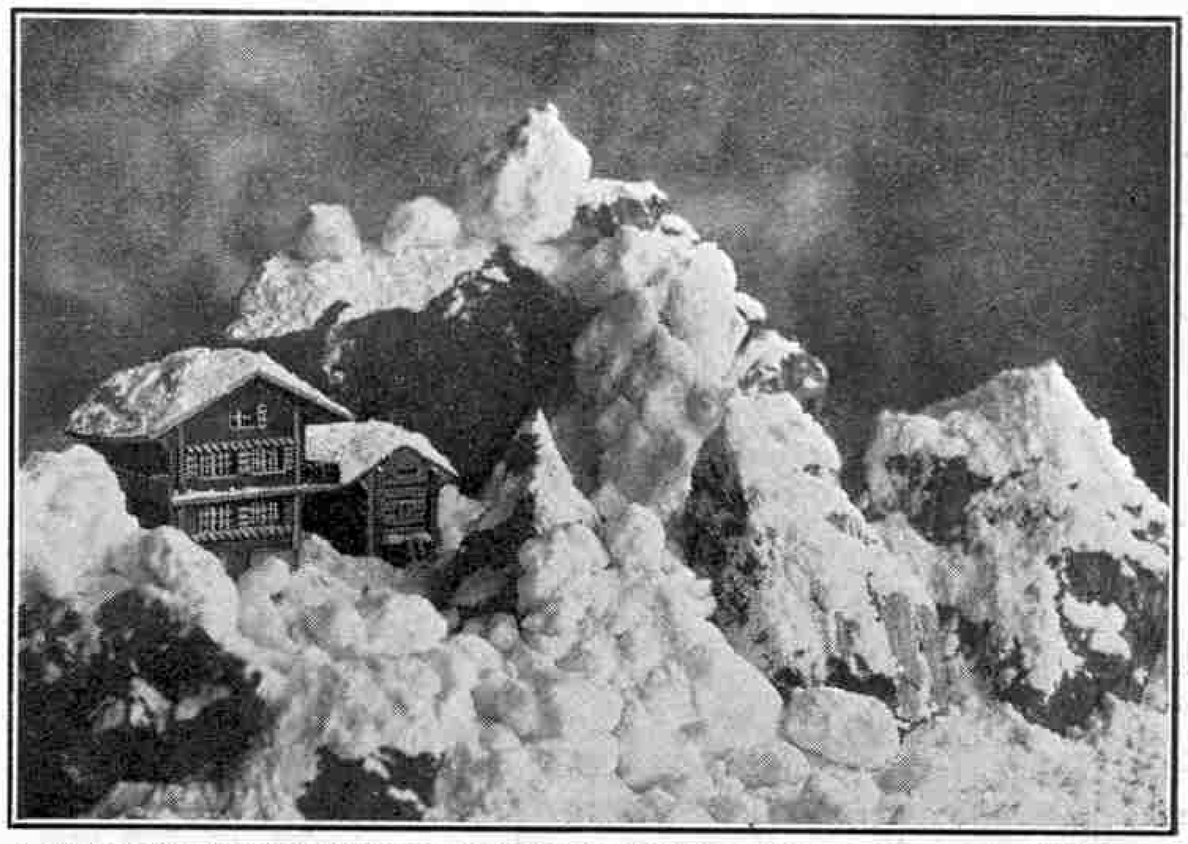
Probably the best of all methods of making miniature figures is to build them up on wire skeletons, padded with cotton wool. This is not difficult, and the work is exceedingly fascinating. A skeleton shape is first made from iron or copper wire soft enough to bend with the fingers. The wire can be twisted into the required shape with a small pair of pliers, and it is advisable to adopt a definite size as a standard for all figures to be made. For example, if the skeleton is made about 3 in. or $3\frac{1}{2}$ in. tall, this would represent a scale of about $\frac{5}{8}$ inch to one foot.

Before the skeleton is padded it is bent into the required pose, and then the body, arms and legs are filled out with cotton-wool, bound into shape and held in place by means of cotton. Heads, hands and any parts of arms or legs that show can be modelled on to the wire in Plasticine or candlewax. Hair can be represented by wisps of cotton wool, which will readily attach itself to the Plasticine. Curls can be made from fine silk thread. This should be first damped with water and then wound around a skewer or a large needle and left until dry, when the curls are ready for use.

Dressing these miniature skeleton figures is really a most fascinating pastime, and if the job is tackled in the proper manner it is quite simple to obtain realistic results. It is better to use pieces of old materials than new cloth, as it is then easier to make the clothes "sit" naturally on the figures. The clothes can be held in place either with Seccotine or a stitch or two of thread, and usually it will be found helpful to slightly moisten the material before fixing it in place.

Time and care spent in making the figures used in a scene will be amply repaid in the realism of the finished photograph, and the photographer will look with special pride on a picture of which the components are entirely his own work.

Buildings, trees, and other articles required in table-top scenes are just as easy to prepare from simple materials and we hope to deal with these in a future issue.



A realistic scene constructed on a table from a few pieces of coal, alum, and a doll's house.

RAILWAY NEWS

Centenary of London-Brighton Main Line

The London-Brighton main line celebrated its centenary on 21st September. Schemes for connecting Brighton with London by rail had been set afoot as early as 1823, but it was not until many proposals had been made and abandoned that the final scheme was adopted and work commenced in 1838. The line was planned by Sir John Rennie, and was completed as far as Haywards Heath, 37¾ miles from London, on 12th July, 1841, the remaining 13 miles to Brighton being then covered by coach. Brighton itself was reached on 21st September in the same year.

The engineer responsible for the actual constructional work was John Urpeth Rastrick, and to him the credit is due for several splendid tunnels, including the Clayton Tunnel described and illustrated on page 251 of the August *"M.M.,"* and the Ouse Valley viaduct. This magnificent structure has 37 semi-circular arches of 30 ft. span each, giving a total length of 1,575 ft., and 11,000,000 bricks were used in building it. An interesting feature was the lighting of the tunnels by gas. This was not of much use to passengers wishing to read in the roofless trucks then used, but it did give them a certain amount of confidence and cheerfulness.

* * * *

During the first two years of the war the L.M.S. ran 14,132 special trains, carrying over 4,000,000 members of the forces and 14,694 tons of baggage. Nearly 350,000 wagon loads of stores, equipment and ammunition have been carried in 10,328 special freight trains, and very large numbers of service men and women have travelled also by ordinary trains.

Time Recovery on the G.W.R.

Some examples recently reported indicate the value of the accelerated running times now allowable. No. 5053 *"Earl Cairns"* of the 4-cyl. "Castle" class, with 454 tons tare, or about 480 full, on a semi-fast Paddington - Oxford - Birmingham train, covered the 30.3 miles from Ealing to Reading in 34 min., thus gaining 6 min. on current timings.

On an up express from Reading to London, No. 4021 *"British Monarch"* of the older "Star" type 4–6–0, was 18½ min. late in getting away with a lighter load of 275 tons, but accelerated in lively fashion to 64 m.p.h. past Twyford, 68 maximum between Maidenhead and Slough and then a sustained 64 again on the level to Old Oak. There a signal check was encountered, but the arrival was no more than 10 min. late. A similar effort was produced by No. 5038 *"Morlais Castle,"* but as on that occasion the train weighed only 245 tons the running could easily have been faster had circumstances warranted. Following considerable delays, the similarly loaded wartime version of the *"Bristolian"* hauled by No. 4084. *"Aberystwyth Castle"* ran in from Reading, passed at full speed, to Paddington, including a check, in 35 min. for 36 miles, thus arriving only 4 min. late by public schedule. Actually the summer working arrival time was 6.57 p.m., 3 min. earlier, but even so a considerable margin for time recovery is at present normally available.

Along the north main line between Gobowen and Shrewsbury, a "Star" No. 4025, hitherto named *"Italian Monarch,"* hauling 315 tons, made a very fast start to stop run in 20 min. for 18 miles, thus recovering 2 min. of a fairly smart booking. Taking advantage of a downhill start, Rednal 4¾ miles was passed in 6 min. 25 sec., and then over a steeply undulating road 11¾ miles were covered in 10 min. 25 sec. at an average of 68 m.p.h., with a maximum of 74 and a minimum of 62½.

L.N.E.R. No. 4463 "Sparrow Hawk" passing Hadley Wood with a heavily loaded East Coast express.

Higher Speeds Over Junctions

In order to prevent the enforcement of severe speed restrictions over junctions or permanent way crossings, two-level layouts have been designed for use at several main-line converging points and also to reduce the effect of sharp curves.

Superelevation or cant is given to a diverging line by means of a progressive thickening of the bases of the chairs, coupled where necessary with a tilting of the crossing timbers (sleepers), so that the diverging road may be given additional elevation up to 3 in. The straight track is carried up and down very gradually. Safety is increased and frictional resistance reduced by this measure.

S.R. Locomotive Items

The naming ceremony of the second "Pacific," 21C2 *"Union Castle,"* took place at Victoria station, London, amid the many activities of ordinary traffic. The tenders for these new 4–6–2 engines are being built at Ashford.

Several Stroudley "D1" tank locomotives of the ancient but efficient Brighton 0–4–2 type are on loan to the L.M.S.

Others of the class have been fitted with injectors, and with water pumps and external piping, to act as fire-fighters.

We learn that an experimental electric locomotive, type CC1, has been built at Brighton, mounted on two six-wheeled bogies fitted with collector shoes. There is also a pantograph for taking current from overhead wires should these be provided in shunting yards.

A reader reports a journey on the G.W. Reading-Basingstoke branch in a corridor coach labelled *"Paddington, Birmingham, Wolverhampton"* behind S.R. "Atlantic" No. 2423 *"The Needles."* Several of these "Atlantics," former L.B.S.C. engines, are now stationed on the G.W.R., and there are joint G.W.—S.R. locomotive workings between Reading and Southampton.

Irish Tidings

During 1940 the following Great Southern locomotives were scrapped: 4–4–0 No. 453; 0–6–0 Nos. 129, 449 and 649; 0–4–4T Nos. 70 and 72; 0–6–0T No. 472; and 0–6–4T No. 203. The one new engine turned into traffic was the large 4-6-0 No. 802.

On account of the shortage of coal, and of the low quality of what is obtainable, train services have had to be considerably reduced and difficulty is sometimes experienced in maintaining steam.

L.N.E.R. Gallantry Medal

The directors have introduced a silver medal that may be awarded to members of the staff for outstanding acts which are not concerned with enemy action, but which are of such a standard as would warrant recommendation for Government recognition of bravery.

* * * *

Railwaymen on duty killed by enemy action number 280, and those injured 1,500.

L.N.E.R. Running News

Further new "V2" 2–6–2 mixed traffic locomotives of the "Green Arrow" class, numbered 3655-8 and 4889-90, have been seen at work. The following original Gresley "A1" Pacifics have been converted to the "A3" class by the provision of boilers pressed to 220 lb. per sq. in.: 2545 *"Diamond Jubilee"*; 2551 *"Prince Palatine"*; 2571 *"Sunstar"*; and 2575 *"Galopin."* We understand that with the exception of 2571 all these are provided also with steam collector domes.

Several of the "A4" streamlined 4–6–2 engines are now running with the lower valences of the outer casing removed, thus permitting easier accessibility of wheels and motion. The special sleeping and restaurant car express which conveyed the Prime Minister and his staff officers back to King's Cross, after the historic sea meeting with President Roosevelt, was hauled by the newest "A4," No. 4903 *"Peregrine,"* in charge of Driver Hirst and Fireman Quince, of Doncaster.

Among unusual observations reported from the North Eastern area comes the news that one of the blue beaver tail observation cars from the *"Coronation"* was attached to the rear of the through L.N.E.R. express from Ashford, Kent, but was not vestibuled to the rest of the train. A Worsdell "C6" class 4–4–2 engine hauled three historic old locomotives which, among others exhibited there in recent years, have been removed from York Museum to other resting places as a temporary measure. The strangely assorted trio consisted of G.W.R. 4–4–0 *"City of Truro,"* L.N.W.R. 2–2–2 *"Columbine,"* and L.B.S.C. 0–4–2 *"Gladstone,"* which is the property of the Stephenson Locomotive Society. Some of the newer cars operating the Tyneside electric passenger services are now painted pleasingly in blue below the waistline and light grey above, instead of the usual red and cream. The Gill Sans type L.N.E.R. monogram is painted on the sides in black.

That record-breaking combination, Driver Duddington and No. 4468 *"Mallard,"* recently brought into King's Cross at 2.22 p.m. the Hull express due there at 2.20 p.m., although reported 18 min. late from Peterborough with a 12-coach train weighing just over 400 tons. Providing the arrival indicator was correct, the 76.4 miles had been covered in 78 min., which was very fast travel for these days.

An unusual double-headed combination seen on a heavy train north of York was the 4–4–0 No. 5501 *"Mons,"* of the former Great Central "Director" class, and "Hunt" 3-cyl. No. 273 *"The Holderness."* Two "Hunts" are sometimes seen together, in addition to many other types.

"The City of Miami"

The Illinois Centra Railroad of the United States has placed in service *"The City of Miami,"* a beautifully planned and decorated streamlined Diesel coach train seating 254 persons. This is operating every third day over the long run between Chicago and Miami, Florida, taking 29 hrs., and a daily service is made up in conjunction with trains running on the two routes of other companies. The *"City of Miami"* is air-conditioned, a radio service is provided, and dining, tavern or buffet and lounge-observation cars are included in the make-up. The travelling staff of stewards, stewardess, attendants, cooks and waiters is normally 17 in number. Bright colours are a striking feature of the internal as well as the external colour scheme. Orange, green and scarlet predominate outside, while the inside decorative tints range from the blue of the skies and the blue-green of the ocean to the yellows of the fruit and the sand tones of the beaches, all indicative of semi-tropical Florida.

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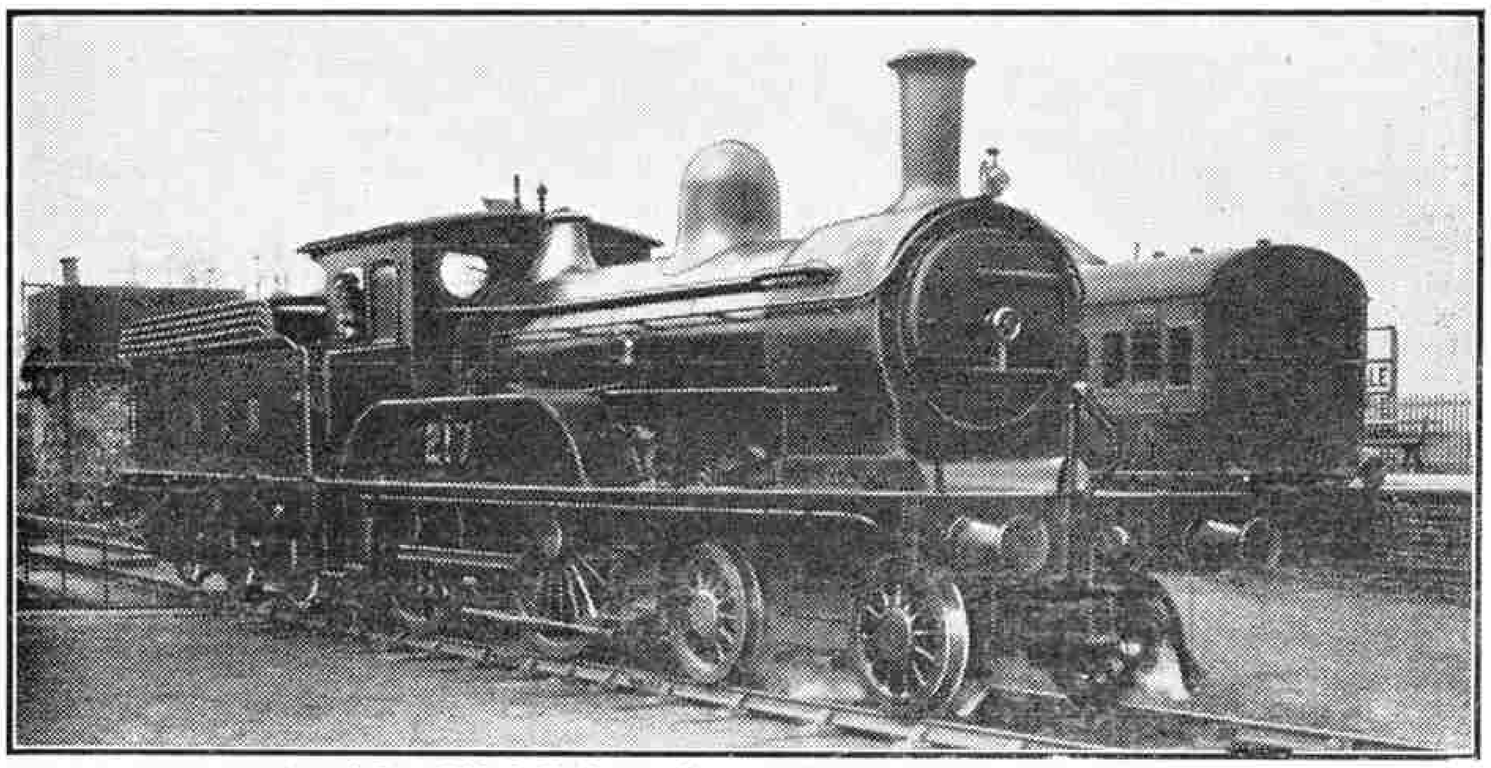
Railways in the United States use 600,000 million gallons of water a year. This would fill a channel 60 ft. wide and 9 ft. deep from New York to San Francisco.



An L.N.E.R. locomotive of Class D23, built for the former N.E.R. as a 2-4-0 in 1887 and converted to the 4-4-0 type 35 years ago. The engines of this class were known as "Waterburys," after a well-known make of watch, as they kept such good time.

THE KENT AND EAST SUSSEX RAILWAY

The Kent and East Sussex Railway is one of the few independently owned, standard gauge, steam-operated British public railways. It operates from Headcorn through Tenterden to Robertsbridge, connecting the main S.R. Dover line with the Hastings direct route. There are three trains a day in each direction over the whole or part of its 21 miles of single line.

This system was authorised in 1896 as the Rother Valley Railway Company. Proposals were originally made for a much more far-reaching network of local railways, which were to connect the market towns of Cranbrook, Kent, and Rye, Sussex, as well as providing for extensions from Robertsbridge to Pevensey, and from Headcorn over high ground to Maidstone. These schemes have never materialised.

The line as at present worked is steeply graded on the Rolvenden-Tenterden-Headcorn section, stretches at 1 in 52-70-80 being encountered after the Rother valley has been left behind. Traffic is controlled by electric train staff. There are few signals and there are no gates at the majority of level crossings over roads. Trains are "mixed" when necessary, including freight wagons as well as the one passenger coach, which is usually an ex-L.S.W. vehicle or a similar one from one of the component companies of the Southern group. An interesting old L.S.W.R. Royal saloon, which was built in 1848, was shown at the Great Exhibition in Hyde Park in 1851, and gravitated to a small one-time independent system near Plymouth, was subsequently seen for many years on the Kent and East Sussex, where it is believed still to exist. It is of the four-wheeled coupé type, and is equipped with "fine panelling, mirrors and adornments" as a contemporary description averred.

There were originally two blue 2–4–0 tank locomotives, and two former L.S.W.R. "Ilfracombe goods" 0–6–0 tender engines, now defunct. The Kent and East Sussex 0–8–0T with outside cylinders, which was built by Hawthorn, Leslie and Co. Ltd. in 1904 and named *"Hecate,"* proved to be rather long and heavy for the modest requirements of the rural line, and was transferred some years ago to the S.R. in exchange for an 1876 0–6–0 saddle tank. This is now K.E.S. No. 4. An ex-L.B.S.C. 0–6–0T of the Stroudley "Terrier" class, now the company's No. 3, was built in 1870 and named *"Poplar,"* but it was renamed *"Bodiam"* on sale. Another, No. 5 *"Rolvenden,"* was formerly L.B.S.C. No. 671 *"Wapping."* One or two rebuilt "Terriers" in S.R. colours and lettering, on loan to the Kent and East Sussex, have frequently been seen working the entire traffic in recent years. The company's No. 8, still in service recently, is an 0–6–0 Manning, Wardle saddle tank, which was acquired some 25 years ago and named *"Hesperus."* She was built in 1876 for the North Pembroke and Fishguard Railway, subsequently passing into ownership of the G.W.R. for a time.

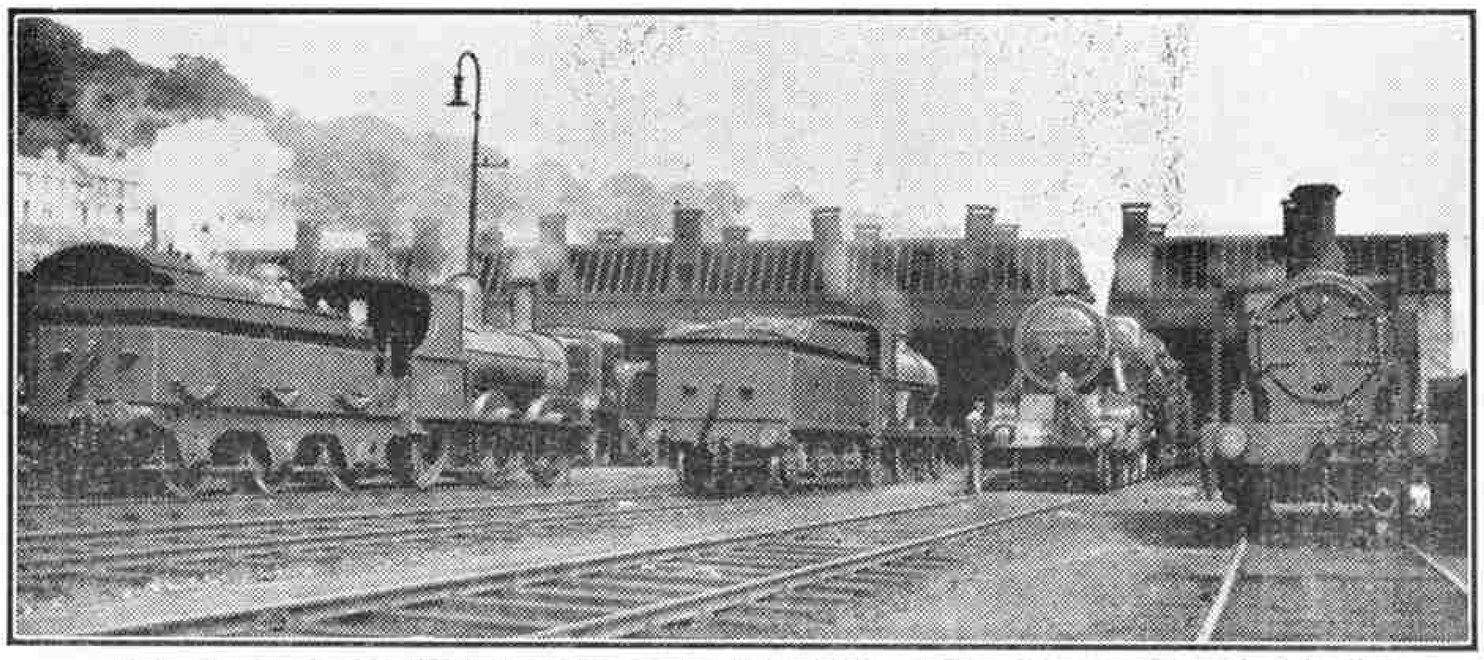
PORTUGUESE RAILWAY ENTERPRISE

In the land of our oldest ally, The Portuguese Railway Company owns two-thirds of the country's total railway mileage, operating independently though mostly on Government account. In normal times the de-luxe *"Sud Express,"* the principal long-distance train, ran from Lisbon through Spain to the French frontier, with direct connection to Paris after passengers had changed from the Portuguese-Spanish 5 ft. 6 in. gauge coaching stock to the standard gauge French cars.

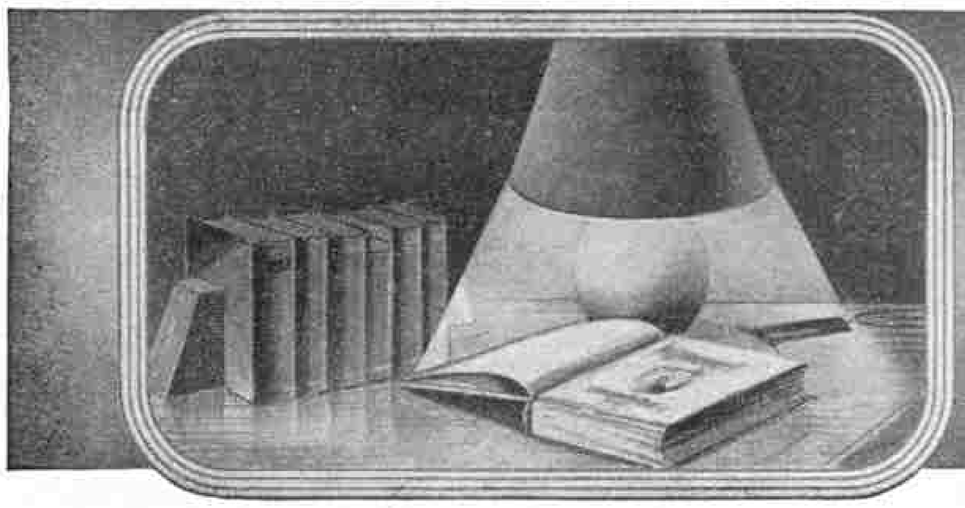
In Portugal the northbound *"Sud Express"* was timed at 55 m.p.h. from Lisbon to the first stop at Entroncamento, and at 52½ m.p.h. through to Coimbra, 139 miles.

These were the fastest runs on the Iberian Peninsula. The Portuguese railway services have had to be severely curtailed on account of coal shortage due to war-time shipping restrictions, the fastest expresses running only on certain days each week.

Notable events of the past year include the arrival of 28 stainless steel passenger coaches constructed in Philadelphia, in the United States. They comprise first and second class composite, second class and dining coaches, and third class vehicles, all very finely equipped for long-distance travel.



A busy scene outside the Cork engine sheds of the G.S.R. of Eire. Photograph by O. S. Nock.



BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Locomotives of the L.N.E.R. 1923-1937"

By K. Risdon Prentice and Peter Proud
(R.C.T.S. 3/6 post free)

In spite of wartime difficulties the Railway Correspondence and Travel Society have produced "*Locomotives of the L.N.E.R. 1923-1937*," a reprint with amendments and various additions, to bring the matter up to date, of a serial article that was published in "*The Railway Observer*," the official organ of the Society. The book can safely be claimed to be the most comprehensive work dealing with L.N.E.R. locomotives, and essential information in it was supplied by the officials of that company.

An introductory chapter deals with the general system of numbering adopted on the L.N.E.R., and there is a table giving a numerical summary of all the locomotive types and the yearly total of each wheel arrangement from 1923. Each type is then dealt with under the 280 class headings in the alphabetical order employed on the L.N.E.R. from A1 to Z5. Engines existing at grouping in 1923 are given, and then follow notes on the engines themselves, their characteristics, and the traffic with which they are or have been associated. Special attention is given to individual rebuilds, experimental alterations and so on. Dates of placing in service and of withdrawal also are given. Electric, petrol and departmental locomotives and railcars are dealt with, and the final sections give lists of named engines and the numbers of all the 9,300 locomotives owned by the L.N.E.R.

There are 73 illustrations, chiefly of engines of the less common and in many cases extinct classes. L.N.E.R. enthusiasts will welcome the book, which is obtainable from K. R. Prentice, The Croft, Belstead Road, Ipswich, Suffolk.

"Fleet Wings"

By Guy Dempster
(Lutterworth Press. 3/6 net)

Life in the Fleet Air Arm, with attacks on Narvik by air and on land and daring adventures in the air and afloat during the evacuation of Dunkirk, provide a splendid background to this thrilling story. It concerns two midshipmen, one the pilot and the other the gunner of an aircraft of the Fleet Air Arm. They enjoy terrific adventures on service, and at the same time carry on a private war with an old school acquaintance of German origin who acts as a spy and turns up at the most inopportune moments. In the last scene one of them has a thrilling air duel with the spy.

"He Went With Christopher Columbus"

By L. A. Kent (Harrap. 6/- net)

There must be few boys who would not have been thrilled to sail with Christopher Columbus and thus to be among the first white men to enter the New World. This was the fortunate experience of Peter Aubrey, an English boy who had gone to Spain to visit his father's estates there. Peter had narrowly escaped being killed on the way by a servant of his rascally uncle, who wished to seize the estates for himself, and it was to escape his uncle that he joined the company sailing with the great explorer.

The details of the famous voyage are told fully, fact and fiction being cleverly woven together. Peter is left on an island in the West Indies, living with an Indian tribe, and he has several years of adversity and adventure before he manages to return to England and claim his estates, which in the meantime had been enjoyed by his uncle.

The volume is a worthy addition to its publishers' series of famous travellers' voyages, of which it is the third. There is a fine coloured frontispiece, with many splendid drawings in the text.

Owing to difficulties that have arisen as the result of war conditions it is impossible to guarantee the immediate delivery of books ordered in accordance with the scheme explained at the head of the first column on this page. For this reason readers who order books must be prepared for some delay, but every effort will be made to ensure speedy despatch.

"Simple Aerodynamics"

By A. H. Smith
(The Harborough Publishing Co. Ltd. 3/- net)

The really serious aeromodeller is not long content to copy someone else's design or figures. He soon develops a desire to work out things for himself, and this handbook is designed to start him on the right track by giving him a practical knowledge of the principles of flying that will serve as a stepping stone to "grown up" works on the subject. All that the reader needs to begin with is an elementary knowledge of algebra and trigonometry.

After defining the various units employed in aerodynamic formulae the author shows how to calculate lift and drag, aerofoil section, aspect ratio—that is, the relation between the length and breadth of an aerofoil—tailplane and fin area, and other essentials. He explains how to work out stalling speed, rate of climb, gliding angle and sinking speed, details that enable the constructor to ascertain beforehand what his proposed model can be expected to achieve in flight, and a separate section deals with calculations relative to the airscrew.

The book is illustrated by reproductions of photographs, and many useful line drawings.

"Three Green Bottles"

By Aubrey De Selincourt
(Routledge. 7/6 net)

Robin Chale believes that if he goes on looking into empty bottles long enough he is sure to find one with a message in it. With his brother Anthony and their two friends Ann and Elizabeth he spends happy days sailing in the estuaries of the East Coast, enjoying great fun with them and with Uncle Lance and the Bo'sun; and of course he keeps a keen look out for empty bottles, which make splendid targets for air gun practice. At last his pertinacity is rewarded, for a message in a bottle gives him the clue to a buried treasure and the search for this is full of thrills and excitement. The treasure proves to be somewhat startling, but it must be left for the reader to discover what it was and how it reached its hiding place.

The book tells a delightful story that never lacks interest. It is illustrated by excellent drawings.

"The Call of the Cougar"

By F. Lloyd-Owen
(Harrap. 5/- net)

This is a family story of life on a small ranch in British Columbia. Stephen Middleton and his young sister have to run the ranch while their parents are away, but they are capable and enjoy every minute of it. In the spring, when the family is reunited, life becomes very busy and interesting, with animals to be looked after, stores to be fetched and rambles in the woods and mountains to be enjoyed.

One of these rambles leads to exciting events, for on it they discover an old gold working. It was then that the call of the cougar began to be heard, but strange to say, animals hearing the sound of this fierce beast did not seem disturbed. The reason was only discovered later, when it transpired that Indians of a distant tribe, who used the cry of the cougar as their tribal call, had discovered unsuspected gold in the old workings and had been extracting it illegally. After a struggle they are disposed of and the Middletons share in the good fortune that follows.

"People of the South Pole"

By K. Graham Thomson
(Lutterworth Press. 3/6 net)

An Antarctic expedition is given a great surprise when it discovers a tribe of primitive people in that inhospitable land. The Polarians inhabit caves in a volcanic mountain, and when the Leader of the expedition and two of his men are taken there as prisoners they find survivors from a shipwreck nearly 100 years earlier, white people who had never known the countries from which their parents had come. Both prisoners and the members of the English colony are rescued after an exciting tussle in which modern arms prove to be too much for the primitive folk of the frozen world.

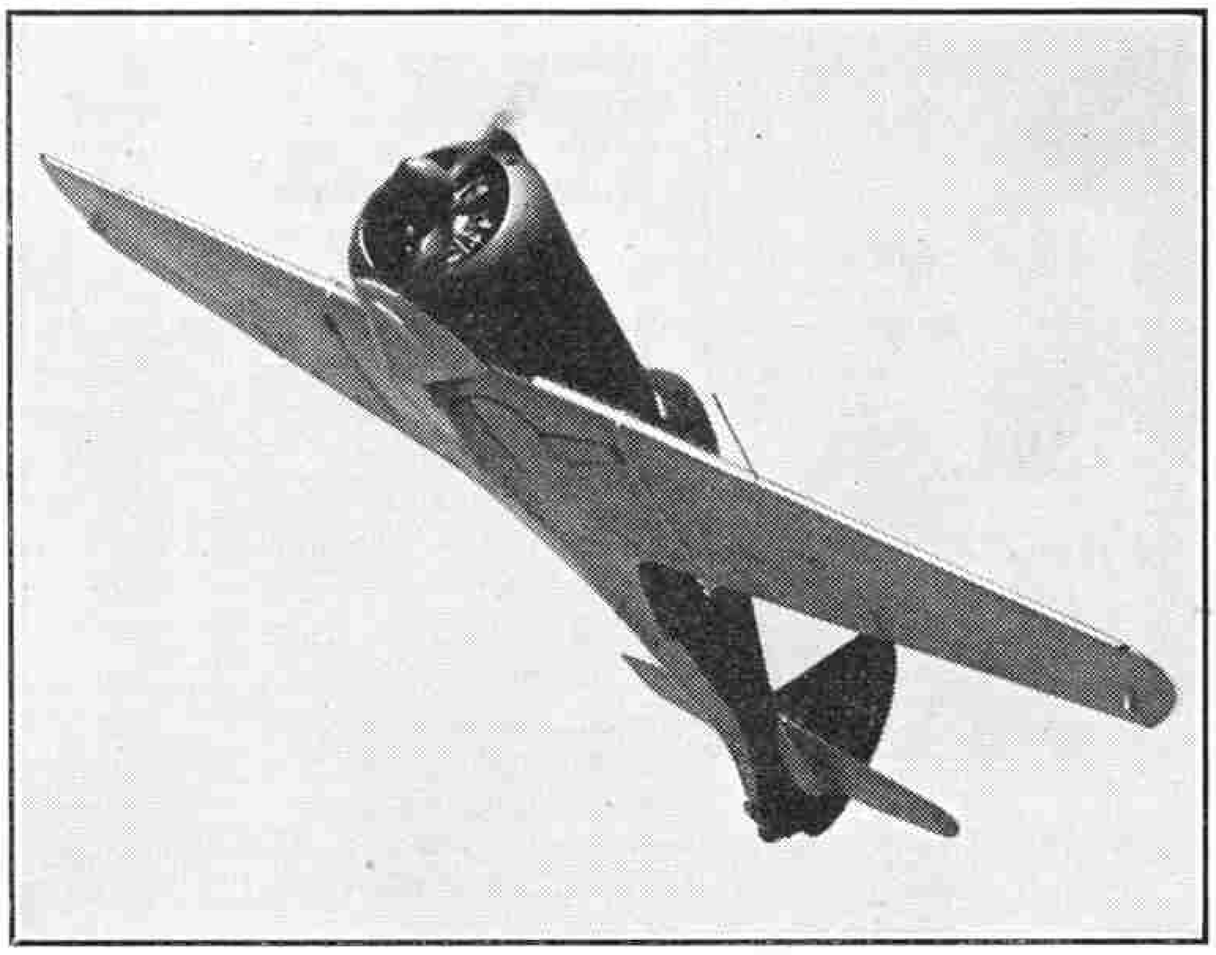
New American Interceptor Fighter

A Curtiss-Wright Fast Climber

THE chief function of the interceptor fighter is to make contact with the enemy at short notice, as when warning is given of the approach of enemy raiders. The interceptor fighter takes off immediately the alarm is given, and must meet and engage the raiders before they can reach their objective. Very rapid rate of climb, a high maximum level speed in flight, and great manœuvrability are therefore essential features of this type of machine.

A new single-seater interceptor fighter that fulfils these conditions has been demonstrated in the United States at the St. Louis Airplane Division of the Curtiss-Wright Corporation. This is the Curtiss-Wright Model 21-B. It can climb to 16,400 ft. in 5 min., and it is claimed that it can fly a mile vertically in one minute. It has a guaranteed maximum level speed of 333 m.p.h. at 18,000 ft. At the cruising speed of 282 m.p.h. the machine has a range of 630 miles, and there is provision for fitting additional fuel tanks to increase this range. Its ability to take off after only a short run, and its extremely steep angle and high rate of climb, enable it to operate from temporary aerodromes of small dimensions, such as isolated bases that may be used for interceptor operations against invading aircraft.

Normal equipment includes provision for two .30 calibre and two .50 calibre machine guns mounted in the fuselage and synchronised to fire through the airscrew disc. All the guns are situated near the line of sight for accuracy of fire, and they are controlled electrically by means of a trigger in the control stick handgrip. The ammunition boxes are so arranged that they may be readily loaded or removed through the top of the fuselage. Four more machine guns, two of each of the calibres just mentioned, can be fitted on the underside of the wing outer panels, with ammunition boxes for them inside the wing, directly above each gun.



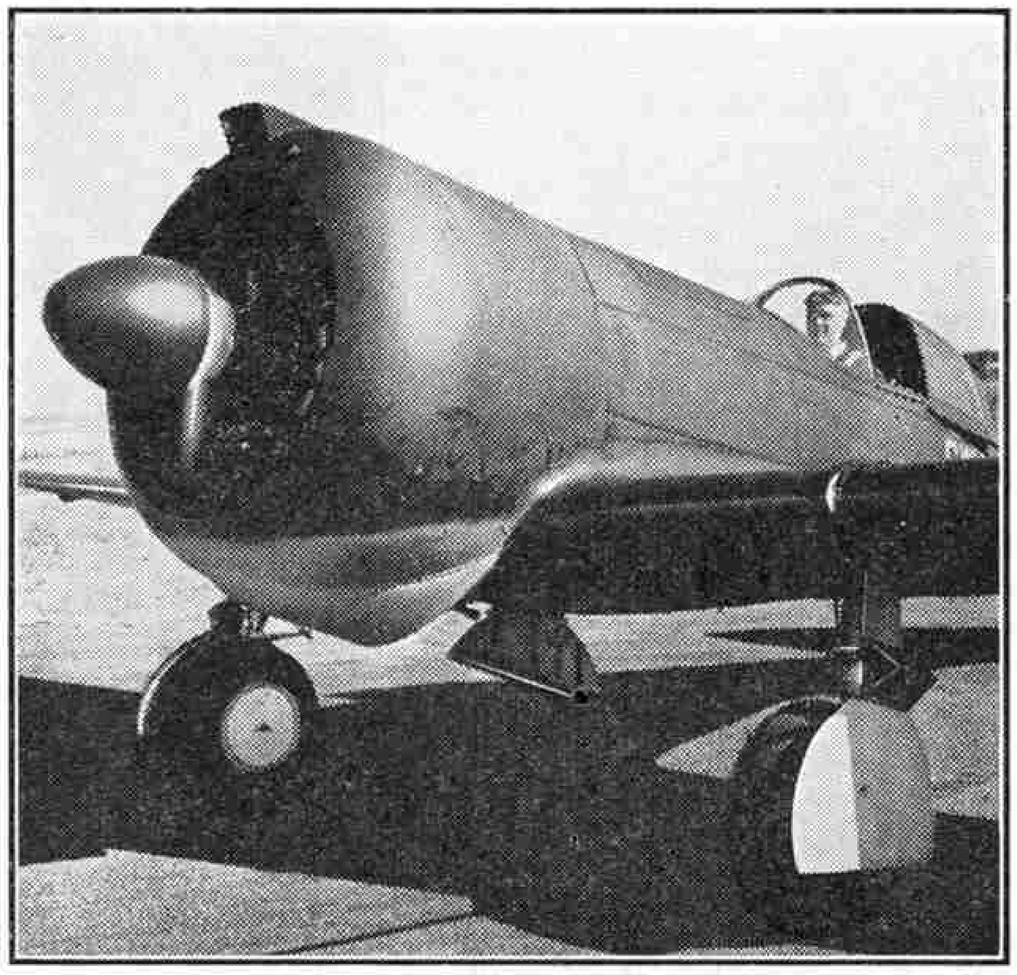
The Curtiss-Wright Interceptor Fighter in a characteristic climbing attitude. The illustrations to this article are by courtesy of the Curtiss-Wright Corporation, U.S.A.

It is essential in designing an interceptor type of aeroplane that weight be kept as low as possible in order to maintain the greatest performance, particularly in regard to rate of climb. The Curtiss engineers therefore took special care in selecting each piece of equipment used in constructing the Model 21-B. All the principal structural components, with the exception of the landing gear and engine mounting, are made of stressed aluminium alloy.

The Curtiss-Wright 21-B is a low wing monoplane, with the centre panel of the wing riveted to the fuselage. This tapers sharply from the pilot's cockpit aft of the wing to the stern, which carries a tail unit with single fin and rudder. The cockpit has a transparent sliding roof, and its extensive equipment includes complete lighting for night flying, and an electrically lighted "tell-tale", or warning signal that automatically indicates to the pilot any improper operating conditions. Immediately behind the cockpit the fuselage structure is reinforced with a bullet-proof steel bulkhead, $\frac{1}{4}$ in. in thickness, to protect the pilot's head and shoulders from gunfire from the rear, or from serious injury if the aeroplane is turned completely over on the ground.

The Wright "Cyclone" 9-cylinder radial engine fitted in the fuselage nose delivers 1,000 h.p. for take-off, and its two-speed supercharger enables it to develop this output at 5,600 ft.

The main wheels of the landing gear are attached to the outer ends of the wing centre panel, and their hydraulically operated brakes are worked individually through separate toe pedals mounted on the rudder pedals in the cockpit. The landing gear is actuated hydraulically by a retracting cylinder and piston. It is locked in the "down" position by means of a geometrical arrangement of the mechanism, and in the "up" position by an eyebolt on the axle tripping a spring-loaded hook.

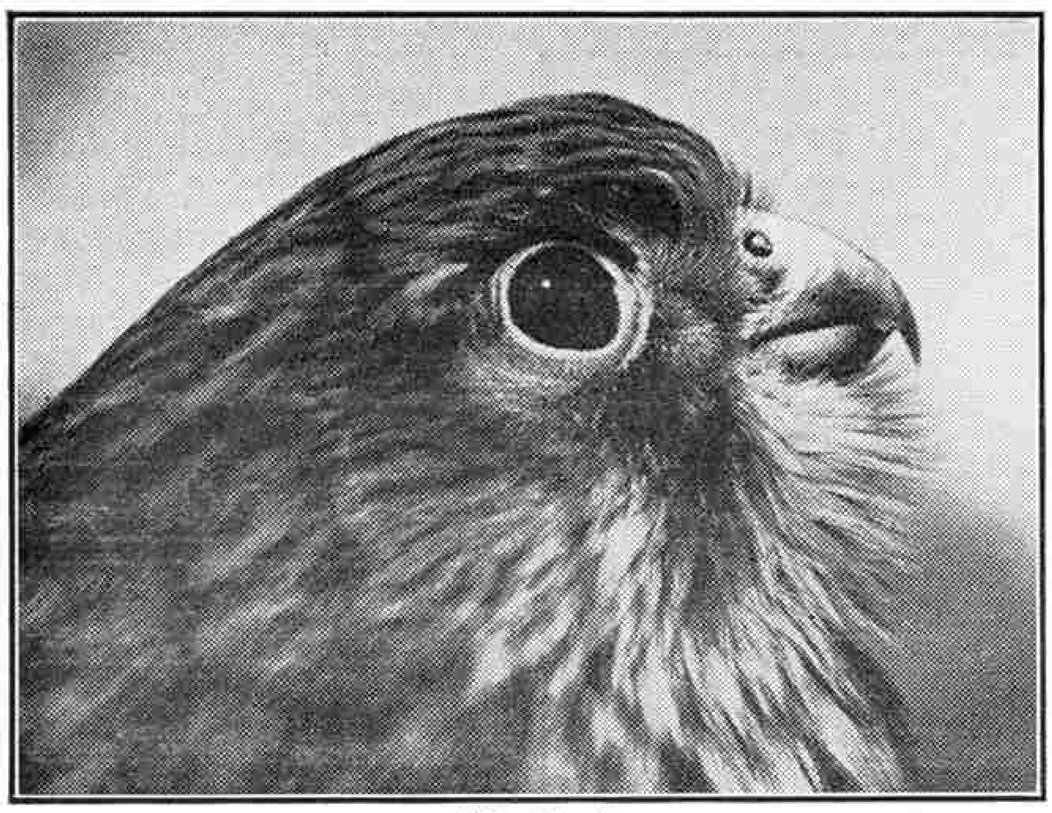


The "snub" nose of this radial-engined interceptor fighter.

"Kee-Kee," My Kestrel

By Walter J. C. Murray

TO climb a tree and arrive at a bird's nest at the exact moment when the first chick hatches cannot be the experience of many bird lovers.



"Kee-Kee."

But that the bird should be a kestrel made the event unique, and as it turned out, it was the beginning of a strange friendship, the first link in a chain of circumstances which, for a few months, linked a wild bird's life to mine. For "*Kee-Kee*" was born before my very eyes.

Birdsnesting one April afternoon, with a camera and notebook, in an unspoilt corner of the Sussex Weald, I happened to pass under an old wood-maple where the previous year a pair of magpies had nested. More from habit than from any other reason I gave the trunk a good thump, half expecting to have a bit of fun with a grey squirrel or an owl; because these nests are usually so solidly constructed that they survive the storms of winter, and though the magpies rarely use them again, other creatures often find shelter in them. I was not altogether surprised, therefore, to hear a bird start away, but the fleeting glimpse that I just caught of the tail of the bird set me guessing.

Up the rough old trunk I scrambled. It was not as easy as it had been the previous year when I had discovered the five young magpies. The lower branches had decayed and snapped off, and muddy Wellington boots are not the best gear for climbing. I made it somehow, though what I expected to see I can't say. I had been up to old ruins like this before, and found nothing but mess and decaying leaves. Imagine my astonishment, therefore, when I saw four rusty-brown eggs, the unmistakeable, aristocratic-looking eggs of a kestrel.

One lay a little apart from the other three. It was cracking into halves, and even as I watched the hinder half fell away and the chick appeared. It rested a moment, and then began to struggle vigorously to rid itself of the rest. Scarcely thinking what I was about, I reached round the great dome of thorny twigs, and resting a finger on the shell held it steady so that the baby might drag itself free, and "*Kee-Kee*" was born.

He was an ugly little creature, blind, and naked except for a little damp and straggling yellowish down. He sprawled in a helpless and ungainly fashion, yet already I loved him for didn't I know him better than his own mother?

Although I was very keen to obtain a series of photographs of the young eyasses, it was a fortnight before I was again able to visit the nest. I was worried, thinking that perhaps the kestrels might not escape the vigilance of the gamekeeper. But long before I reached the old maple all fears were set at rest, for from high overhead came the incessant shrill cry, "kee-kee-kee-keee." What a transformation! The great nest looked as if it had been whitewashed, and within were four lusty young kestrels screaming with indignation and rage at my intrusion.

There was no mistaking "*Kee-Kee.*" He was bigger, more thickly clothed with fluffy white down, more noisily wrathful than all his brothers and sisters. Already his beak was hooked; his eyes were like black diamonds, his legs and toes as yellow as mustard, his claws as sharp as razors. When I put my hand in the nest to move him he suddenly threw himself on his back and struck out to such good purpose that his baby talons drew blood from my fingers.

I planned to construct a hide in the upper branches of a nearby oak so that I might take some photographs of the parents at the nest. But the idea was never put into execution, for my third visit coincided with that of the gamekeeper. His plan was to shoot the old birds and leave the babies to die of starvation. To cut a long argument short, I at length prevailed upon him to let me take one of the young kestrels home with me; and so, by another remarkable coincidence, "*Kee-Kee's*" life was saved, and he became my pet.

We built a great aviary for him, and he soon began to enjoy his new life. Raw meat was his chief food, beef for preference; but whenever I could get a beetle or a cockroach, or a mouse, and on one occasion a rat, he accepted them with gusto.

"His life was saved and he became my pet."

Every morning at dawn he awakened me with his continuous cry, "kee-kee-kee-keeee"; and when I went to his cage and talked to him, he too would talk to me in a queer kind of gutteral that he would use to no one else. When the wind blew through his great cage he would turn to face it, and leaning against it he would spread his great wings and hover a-tiptoe on his perch.

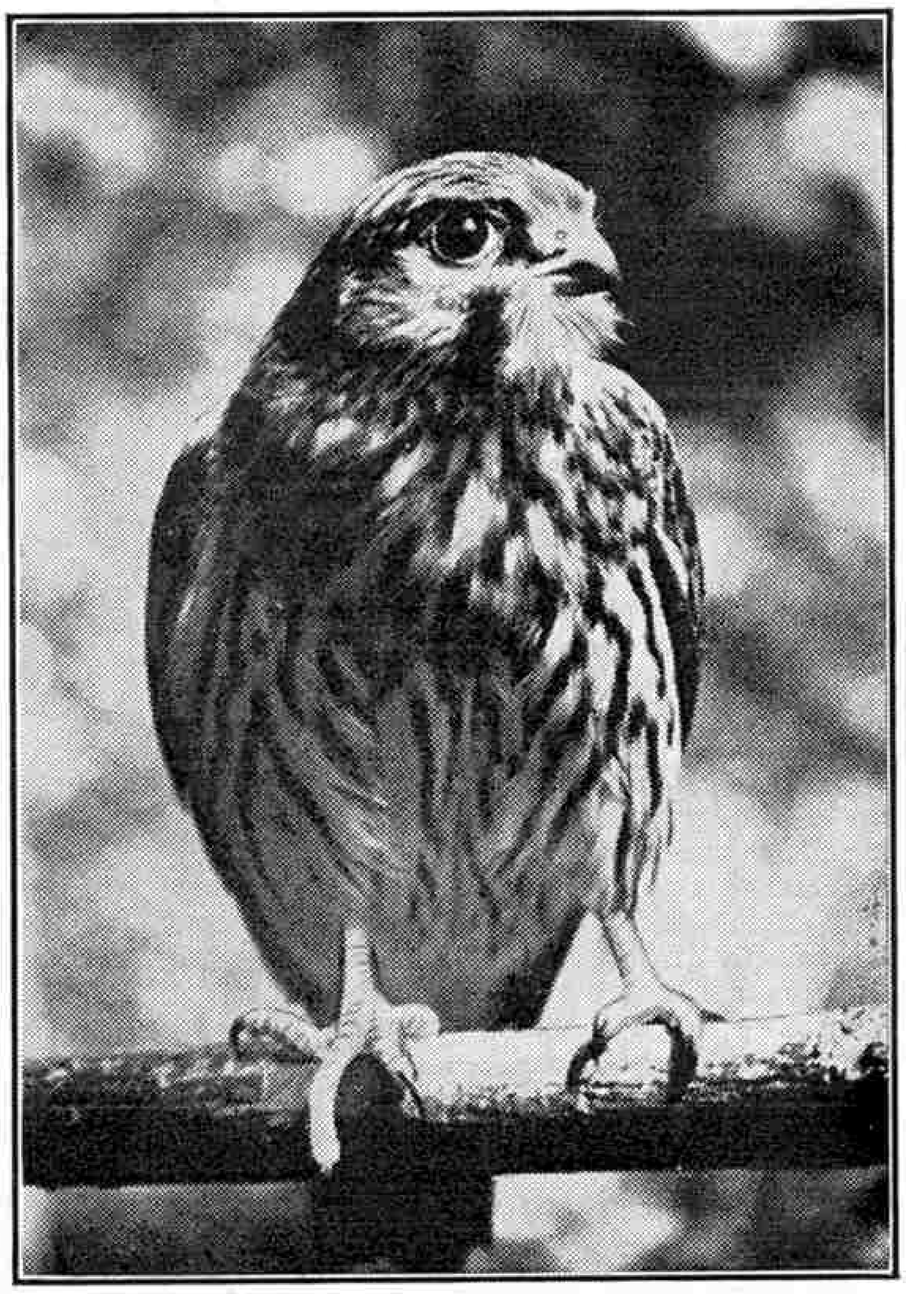
One day the puppy, attracted by the smell of meat, pushed under the wire of the aviary, and *"Kee-Kee"* escaped. For eight hours I saw nothing of him, and then a young member of the family dashed into the house shouting delightedly that *"Kee-Kee"* was on the roof. I hurried out on to the lawn and cried "kee-kee-kee-kee," and as I did so he rose from the roof ridge with an uncertain sort of hovering flight, and settled on the grass close beside me. This was surely a most remarkable act by a wild bird, and still more amazing was the way in which he came crouching close up to my feet whenever anybody else attempted to approach. He seemed to be seeking protection from me, and he followed me into the aviary.

Once again he escaped, and this time he was away for twenty-four hours. But he returned and lived happily in his cage until the beginning of August. Then came the holidays, and as I had made arrangements to go to the Lake District I had to leave *"Kee-Kee"* in charge of a stranger. He was a magnificent bird by then, in almost adult plumage. His black-barred back was a rufous brown, his tail long and black; his beak was strong and polished like mother-of-pearl, and he was the proud owner of a pair of bristling moustaches. His eyes were the most wonderful thing that I have ever seen. Their glorious depth and brilliance it is impossible to describe, for not only were they fierce and keen, but there was something much more in them, something soft and lovely and passionate.

* * * *

A fortnight later I was climbing among the screes and crags on the borders of Skiddaw Forest. Above my head was a most lovely natural rock garden of golden rod and hairbells, heather, ferns, and dwarf juniper and rowan. Suddenly from the midst of this flowery cliff a kestrel swept outward above me. Almost without thinking I cried out "kee-kee-kee-kee." To my astonishment the kestrel came nearer and nearer, and I could see the glint of the sun in his bright eyes. *"Kee-Kee,"* I cried amazed.

"Kee-kee-kee-keeee," answered the kestrel, soaring up above the flowers. "Kee-kee-kee-keee," up, out of the shadow into the sunshine, up into the August blue till I could see him no more.



"He was the proud owner of a pair of bristling moustaches."

But of course I would not have you think that the kestrel that greeted me among the lonely crags of Skiddaw Forest was *"Kee-Kee."* How could it have been? But when I arrived home *"Kee-Kee"* had indeed found his liberty for the last time, and the boy whom I had left to look after him told me that he had escaped some days after I had gone climbing.

Jerusalem's Unique Air-Raid Shelter

By Harold J. Shepstone, F.R.G.S.

NO city possesses such a remarkable air-raid shelter as Jerusalem. It is declared to be one hundred per cent. bomb-proof, safer in fact than the London tubes. It is nothing less than a vast underground cavern beneath the city known as Solomon's Quarries from the belief that it was from here that he obtained his stone for the building of the Temple. The quarry was accidentally discovered in 1852 by an Englishman, Mr. Barclay, while out with his dog. The animal fell down a crevice, and after it had been rescued, the crevice was found to lead into a vast cavern extending a distance of several hundred feet. A minute examination was made of this chamber, which proved to be a great quarry.

It runs in a straight line, in a southerly direction, for over 1,000 ft., spreading out to a considerable width in some places. The roof is supported by great pillars of rock. Here no doubt were quarried and prepared the stones for Solomon's Temple. Engineers declare that there has been sufficient stone taken from these quarries to build Old Jerusalem three times over. The colour of the stone is milk-white, and Josephus speaks of the Temple as looking like "a mountain of snow," and says that it was entirely built of white stone. The Bible account tells us that the stones for the Temple were prepared in the quarry, and that "there was neither hammer nor axe nor any tool of iron heard in the house, while it was in building." The noise of the quarrying in this great underground chamber would not be heard in the Temple area, though it is no great distance away.

As I write, the quarries are being rapidly got ready to accommodate the inhabitants of Jerusalem in the event of air raids. In normal times, however, they formed one of the attractions of the Holy City. On entering them you were handed a candle, while the guide carried also a torch in order to illuminate certain chambers. The pathway is rough and uneven. The guide points out a huge block of stone, about 30 ft. long, that had been detached from the rock foundation, with the exception of one side. It appears to be hanging from the roof. You are shown how the blocks were severed from the rock by means of wooden wedges. You can see the marks of the grooves. These grooves were made with a tool and then wooden wedges were driven into them. Water was sprinkled upon the wedges, which caused them to swell and so loosened the stone. The block was then moved on wooden rollers to the stone-masons' chamber, which can be seen to-day, its floor deeply littered in stone chippings. Niches in the walls for lamps are pointed out. They bear the marks of oil and are blackened with flames.

The stone is quite soft and easily worked; you can break off a piece and fashion it with your penknife. On exposure to the air the stone hardens however, and a sharp chisel is necessary to make any impression upon it. It is found nowhere else, and experts say that the old foundation stone in the Temple area is the same as that in these now abandoned underground quarries.

Opinions vary as to how many people the quarries can accommodate; the wardens say they can at least hold 10,000, with very little preparation. Thus the world's greatest and most extensive underground quarries, founded by King Solomon over 3,000 years ago, are being requisitioned to-day to protect the inhabitants of Jerusalem from air attacks.

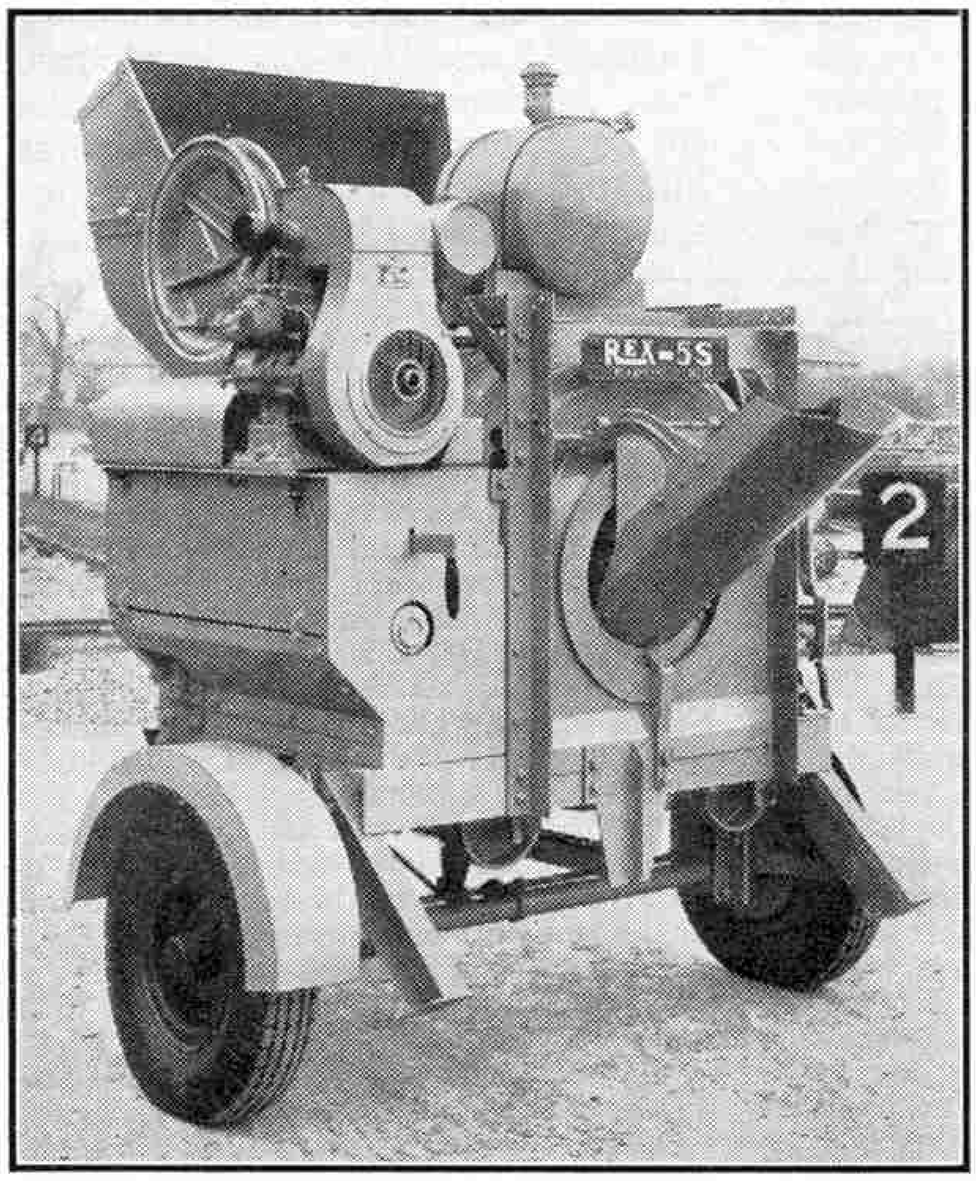
ENGINEERING NEWS

A Portable Concrete Mixer

The illustration below shows a portable concrete mixer designed to be drawn at high speed behind a lorry. For this purpose it is mounted on a sprung frame and pneumatic tyres. The towing pole is telescopic, so that it can be pushed back out of the way when the mixer is in use. A retractable front leg is fitted that can be swung up out of the way when the mixer is in tow, and at the back of the machine are two further retractable legs, which are swung down to take the weight off the springs and tyres when the mixer is stationary and concrete-making is in progress.

The mixer is driven by a single-cylinder air-cooled petrol engine of 7 h.p., the speed of which is reduced as required by a chain gear enclosed in an oil bath. From the engine the power is transmitted to the mixing drum by means of roller chains. The drum runs at 18 r.p.m., and is fitted internally with buckets equally spaced around it. Five blades are placed on the charging side to feed the material into the cascading buckets. The loader is hoisted by wire ropes from an overhead winding shaft, and the clutch has an automatic knock-out, so that when the loading bucket reaches its highest position the brake is automatically applied. Water for use in concrete-making is carried in a tank having a capacity of 11 gallons, and a device is fitted for measuring the exact amount of water required.

A similar smaller unit also is made, and in this the drum speed is 20 r.p.m.



The portable concrete mixer described on this page. Photograph by courtesy of Blaw-Knox Ltd., London.

Building a Great Subway

Towards the end of 1940 there was completed in New York the Sixth Avenue Subway, which is 2¼ miles in length and cost approximately £12,000,000. This great cost was due partly to the variety and number of obstacles encountered in the line of the subway, and the work involved almost every known method of underground construction at different points along its length. In one section alone the builders encountered 15 gas mains, five water mains of from 12 in. to 48 in. diameter, 250 cables carried in 20 banks, a 16 in. steam main occupying a space of over 4 sq. ft., and 14 manholes, each 10 ft. square and from 8 ft. to 10 ft. deep. All these had to be restored within the limited space between the top of the subway roof and the street surface, and this set a difficult problem for the engineers to overcome.

Plastic Paint for Road Marking

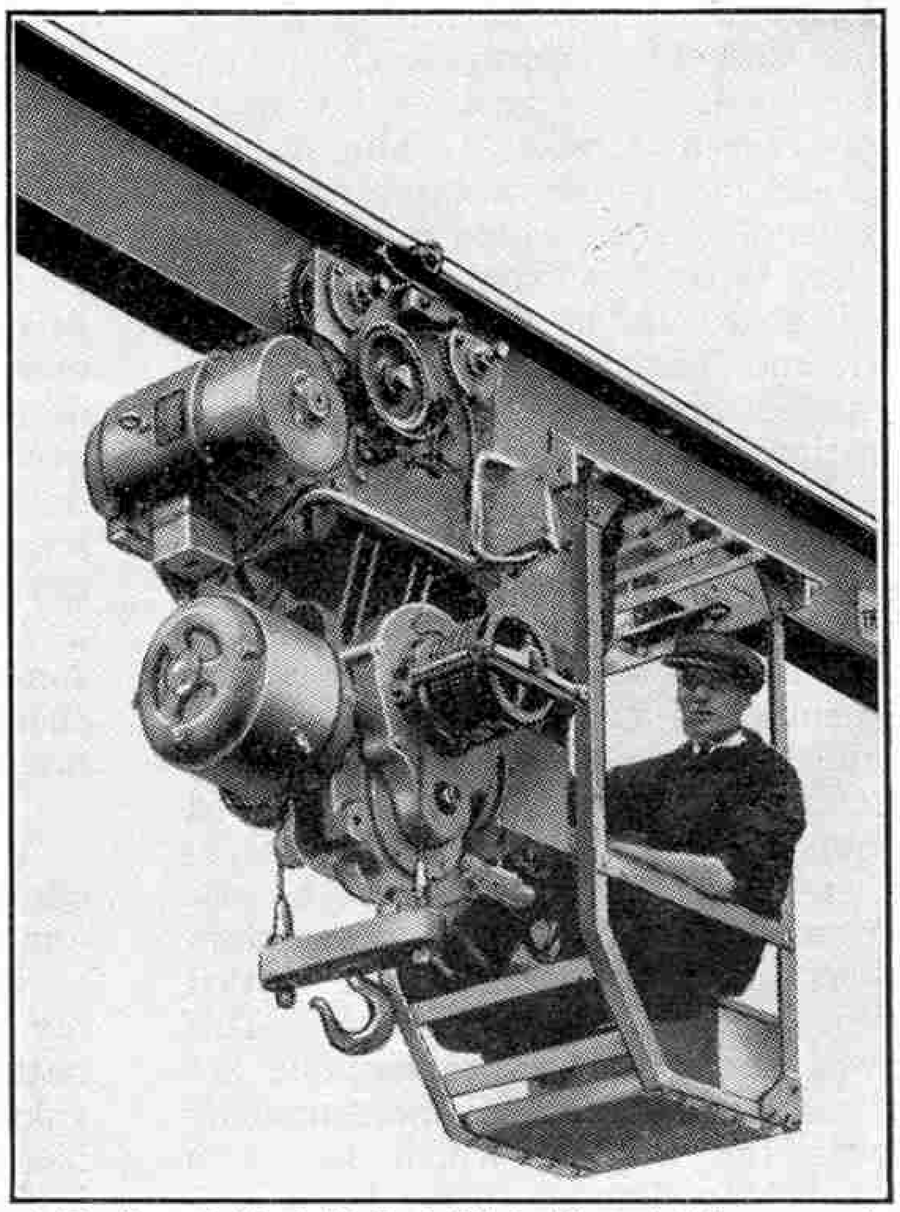
The Road Research Laboratory and the Paint Research Station have been making experiments to find suitable substitutes for the white paint generally used for road marking. It is now difficult to obtain sufficient supplies of this paint, and the Ministry of War Transport has made arrangements for the trial use of a special plastic paint on about 70 miles of roads in different parts of the country. The plastic paint is applied as hot fluid to the road surface, and although it is more costly than ordinary paint, it is thought that its better wearing properties will more than outweigh the greater initial outlay.

Explosive Rivets

One of the latest ideas for speeding up the construction of aircraft is an explosive rivet, made of aluminium alloy, for use at points of a structure that can be reached only from one side. The rivet contains in its shank an explosive that can be detonated by the momentary application of an electric heating gun after the rivet has been set in the required hole. The explosion expands the rivet accurately to a predetermined tightness and one man can set 15 to 20 rivets a minute. The explosive rivets may find applications in other industries, especially if they can be made of steel and in large sizes.

A New Swedish Motorship

The Swedish shipyard Öresundsvarvet recently completed a modern motor fruit carrier of 3,090 tons deadweight built to the order of a Stockholm shipowner. The vessel is intended for carrying bananas between the West Indies and Sweden, but owing to the war it has had to be laid up and will not commence operations until peace returns. It is named "*Sandhamn*," after the well-known yachting centre on Sweden's east coast, and is propelled by four five-cylinder two-stroke engines, developing 4,500 I.H.P. During its official trials a speed of 17 knots was attained.



A Vaughan electric hoist block fitted with a steel frame cage to accommodate the driver and control gear. The block travels along a steel overhead girder. Photograph by courtesy of The Vaughan Crane Co. Ltd., Manchester.

The Institute of Marine Engineers

Examination for admission to Associate Membership and Graduateship of the Institute of Marine Engineers will be held on 1st to 8th June 1942. Admission to Studentship is gained by passing or obtaining exemption from the Common Preliminary Examination of the Engineering Joint Examination Board. This Examination will be held on 14th to 17th April and on 6th to 9th October 1942. The examinations are held in London and other centres in Great Britain.

A scholarship, valued at £100 per annum and tenable for three years, is offered by the General Committee of Lloyd's Register of Shipping. The scholarship will be awarded on the results of a competitive examination to be held by the Institute in May 1942, and is intended to assist marine engineering students to take a university course in engineering subjects. The age limit is 18 years to 23 years. The closing date for entries is 8th April 1942.

Full particulars of the syllabuses and copies of previous examination papers for all the above examinations may be obtained on application to the Secretary, The Institute of Marine Engineers, 73, Amersham Road, High Wycombe, Bucks.

A Canadian-American Pipeline

Engineers in Canada and the United States have been working on the construction of a pipeline for crude oil, which will carry 50,000 barrels of crude oil per day from Portland Harbour to Montreal refineries, and thus save 10 to 12 days of travel by tankers. The pipe was begun simultaneously in the United States and Canada, and the two portions were recently joined by welding near Highwater, Que.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

An Interesting Quarry Railway System

Two white gashes in the North Downs near Betchworth, between Reigate and Dorking, reveal the position of the Betchworth Lime Works. To connect the quarry workings with the kilns and with the Reading-Redhill line of the S.R. there is an interesting railway system incorporating lines of three different gauges.

The first of these lines is one of 3 ft. 2 in. gauge between the quarries and the kilns and grinding mill. On it there is an incline too steep to be worked in the usual manner, and this difficulty has been surmounted by the use of rollers over which a wire rope is passed. At a lower level and at an angle to the first incline, is a gentler one up which puffs a locomotive attached to the hawser, and in so doing lets the wagons down; the process is reversed to haul the wagons up.

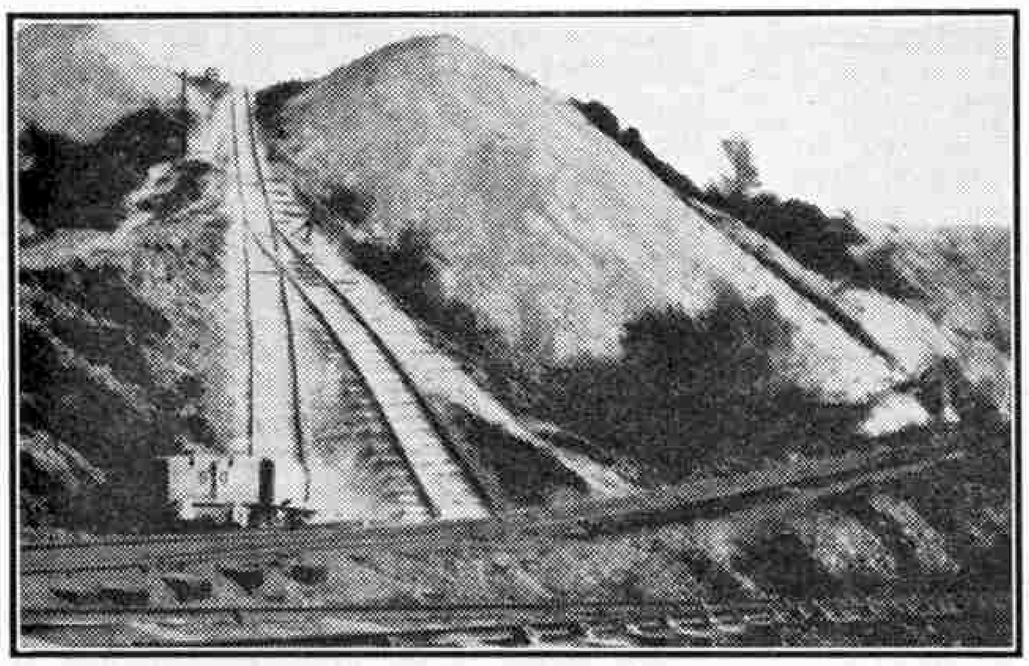
Two locomotives work this line alternately. These are the 0–4–0 tanks *"Townsend Hook"* and *"William Finlay,"* numbered 4 and 5 respectively. They were constructed by Fletcher, Jennings and Co., Whitehaven, in the year 1880. The rolling stock consists of about 70 four-wheel open wagons, fitted with brakes on one side only. The only exceptions are two oil fuel tanks, one of which has the number 71 on its side. This line has a novel and primitive type of catch point, consisting of a movable section of rail that has no spring and is kept in position by an iron bar.

A 4 ft. 8½ in. line affords access from the kilns and grinding mill to the siding adjoining the S.R. station at Betchworth. As on the 3 ft. 2 in. line there are two locomotives, working alternate weeks. These are No. 1 *"Coffeepot"* and No. 3 *"Captain Baxter,"* which are both 0–4–0Ts. *"Captain Baxter"* bears a resemblance to the narrow gauge locomotives, no doubt on account of the fact that it was built by the same makers three years earlier. *"Coffeepot"* also was built by Fletcher, Jennings and Co., in 1871. It is the proud possessor of a vertical boiler and is geared, having six gears in all, three forward and three reverse.

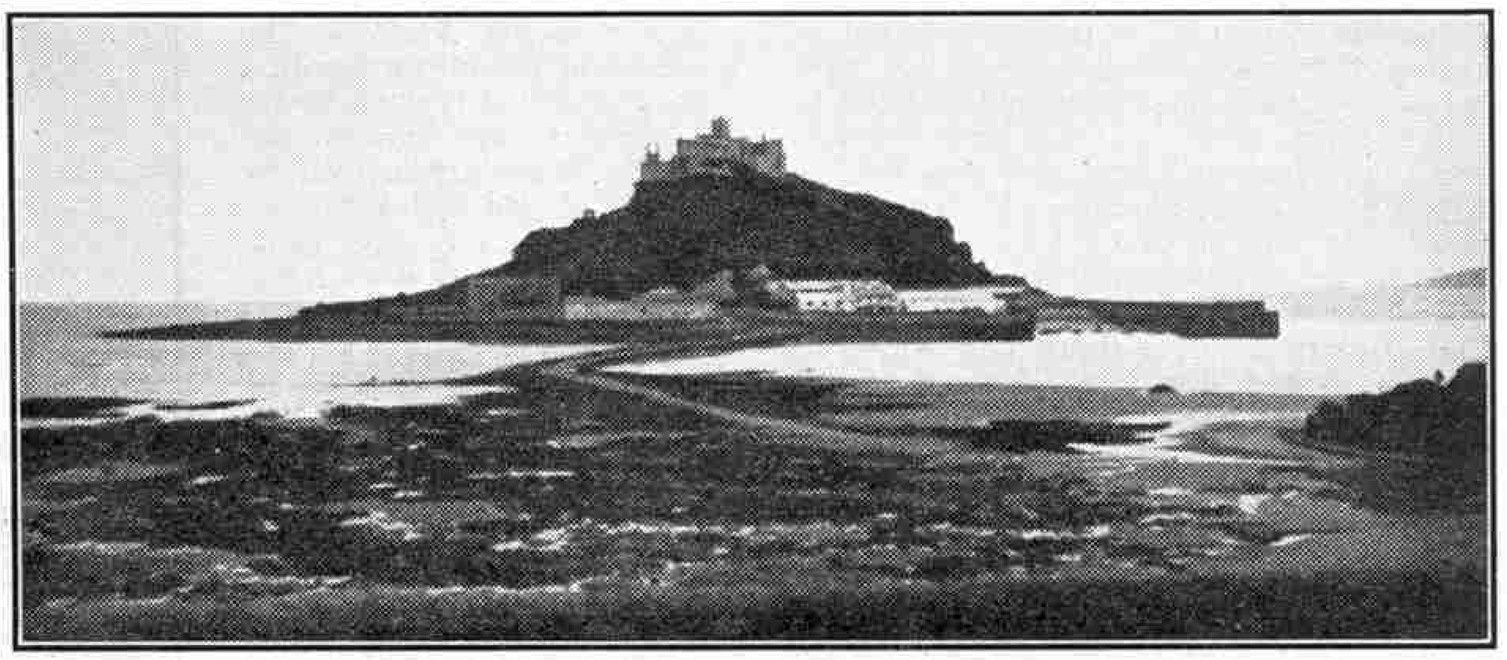
The third line is of 1 ft. 6 in. gauge, and connects the hearthstone workings and the standard gauge line. The motive power here is supplied by a stationary engine. A loading platform is to be seen where the two gauges meet, between the grinding mill and the siding at the station, and trucks of the 1 ft. 6 in. line can be loaded directly into a standard gauge wagon equipped with rails for the purpose. This wagon will carry three trucks.

The types of permanent way in use are diverse, ranging from bull-headed rail, chaired and keyed, to flat-bottomed rail spiked direct to the sleepers. All the locomotives are painted Indian red, but the trucks are unpainted.

S. W. WINKWORTH (Thornton Heath).



The two inclines on the quarry railway system at Betchworth described in an article on this page. Photograph by S. W. Winkworth, Thornton Heath.



St. Michael's Mount, off the Cornish coast. Photograph by G. Wilson, Truro.

Cornwall's St. Michael's Mount

Reading about Mont St. Michel in the *"From Our Readers"* page of the July *"M.M."* brought to mind our own St. Michael's Mount in Cornwall. The "Mount," as local people call it, is situated about half a mile off the mainland in Mount's Bay, near Marazion. It rises out of the sea to a height of 250 ft. and on top stands the castle and priory.

In the old days the rock was a stronghold, and a very good one, too. If it was defended bravely, it was a miniature Gibraltar and almost impossible to capture. At high tide it can only be reached by boat, but at low tide one can walk along a seaweedy causeway joining it to the mainland. Visitors by boat sail into its picturesque little harbour, the quays of which are lined with white-washed houses. They are shown to the castle by a guide, but a stiff climb has to be faced to get there! The winding path is surrounded by trees, which cover most of this "pyramid," but the side facing Penzance is rocky. G. WILSON (Truro).

Roman Lead Mines in the Mendips

When visiting Priddy in North West Somerset recently, I was greatly interested in the remains of the old lead workings in the district, which date from Roman times. These are very extensive and at one time more than four thousand lead miners were employed in the mining area. They were a busy thriving community, but as the pockets of lead ore were exhausted they gradually died out.

The remains of the old Roman workings consist of a series of "cuts" along the face of the undulating slopes of the Mendips, a number of large dumps of waste, and the ruins of several kilns in which the ore was smelted. The kilns themselves are cluttered up with rubbish, but their chimneys still stand upright.

The "cuts" are connected with the kilns by covered passages, which are really trenches with limestone roofs level with the surrounding ground surface. Care has to be observed in exploring these as the stone roofs are weak in places, and some sections have collapsed. The covering is slightly arched.

The surrounding countryside is mainly given over to gorse and bracken. Rabbits have their burrows here, but they cannot be eaten owing to the lead prevailing in the soil and in the grass and other plants. It is amazing that the rabbits themselves thrive, but they seem to be immune to lead poisoning. P. A. HEAL (Chilcompton).

Dene Holes in Kent

Near Bexley, which is only about 12 miles from the City of London, there are an ancient well and many dene holes. The well is sunk about 100 ft. deep, and its sides are strengthened by large stones about 1 ft. long and 9 ins. thick. It is now almost overgrown with bushes and looming up from the darkness can be seen a tree growing from the side of the well. The dene holes are to be seen in many parts of the surrounding woods, and entrance is gained by descending a vertical shaft.

A tunnel is usually found at the bottom of a dene hole, and on the floor of this are skeletons of wild animals that have plunged down the entrance to be killed instantly at the bottom. The tunnel leads to a group of small caves in which have been discovered remains of various type of pottery, weapons and armour, most of which has been removed to museums. One local man who ventured down into a dene hole about five years ago dropped his torch on the return journey, and he had to finish the climb in darkness. E. R. NORTH (Bexley).

New Meccano Models

A Fine Coach and a Jolly Roundabout

THE first of two interesting models we are describing this month is a realistic old-fashioned horse coach, shown in Fig. 1. Construction of this is begun by building up the chassis. The wheel axles are 3½″ Rods journalled in Handrail Supports bolted to springs consisting of 2½″ Strips, which are bent as shown and bolted at their ends to Hinges. A compound strip 1, formed from two 5½″ Strips overlapped, is attached to each of the front and rear springs. At the rear the strip 1 is fixed to a 1½″ Strip bolted to the axle springs, and at the front it is attached to a Double Arm Crank 2 bolted to a 2½″ Strip. The front axle unit is pivoted on a 1½″ Rod fixed in the Double Arm Crank 2.

To build the body of the coach, two 2½″ Flat Girders are overlapped and bolted to Obtuse Angle Brackets secured to a 2½″ × 1½″ Flexible Plate 3. Two 2½″ Cranked Curved Strips are attached at each side to a 2½″ × ½″ Double Angle Strip fixed to the Plate 3. One of the Cranked Curved Strips at each side is bolted to a 1½″ Strip and to a 2½″ × 1½″ Flanged Plate that forms the driver's seat. At the front of the seat is a 2½″ × 2½″ Flexible Plate, which is attached to the sides of the coach by ½″ × ½″ Angle Brackets. The sides and back of the seat are represented by a 5″ Rod bent as shown, and held in Handrail Supports.

The other Cranked Curved Strip at each side is bolted to similar Strips, and the space between these Curved Strips is filled in by a piece of thin cardboard cut to the required shape. A 2½″ × 2½″ Flat Plate 4 is also joined to the Curved Strips at each side, and a similar Plate 5 and a Semi-Circular Plate 6 are bolted to it.

The floor of the coach consists of two 4½″ × 2½″ Flexible Plates overlapped and bolted to ½″ × ½″ Angle Brackets attached to the sides. The back is a 2½″ × 2½″ Flexible Plate fixed to ½″ × ½″ Angle Brackets bolted to the Plates 5. A 4½″ × 2½″ Flat Plate forms the roof and is attached to 2½″ × ½″ Double Angle Strips bolted to the Plates 5. At the front the roof is supported on 2″ Rods held in Rod and Strip Connectors bolted to Plates 4.

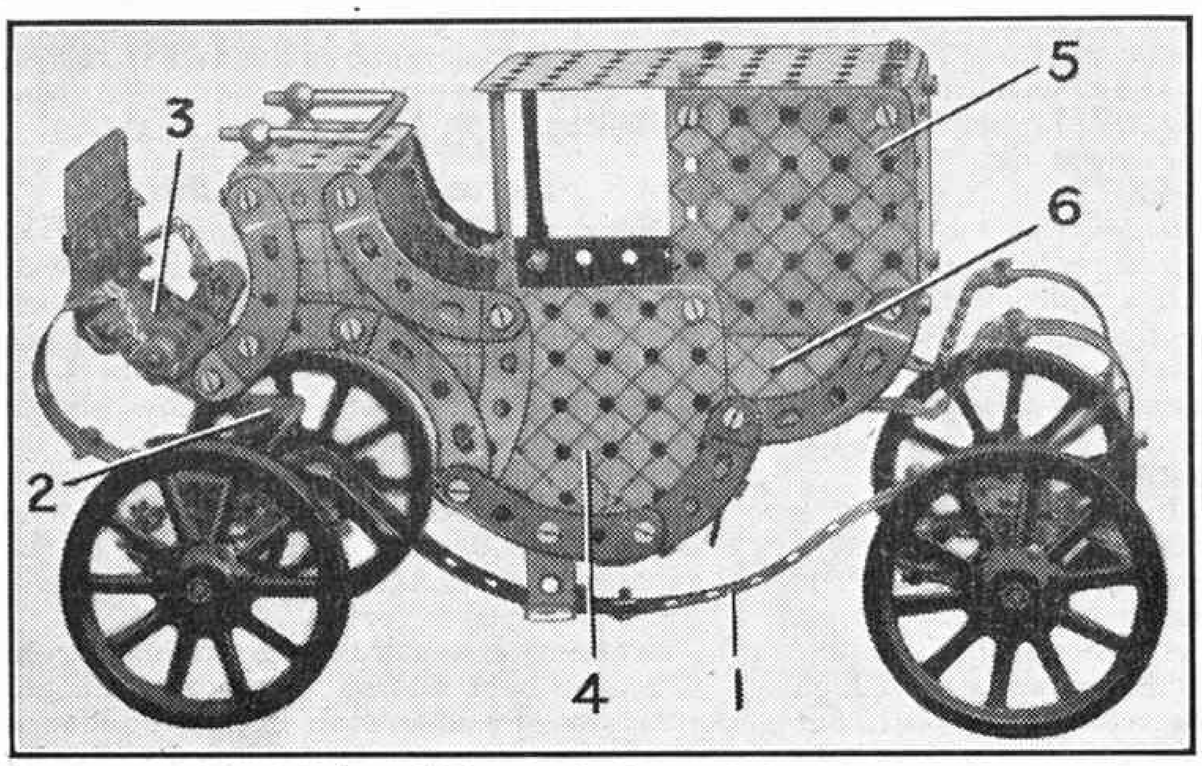


Fig. 1. A simple model of an old-time coach. It was designed by a reader of the "M.M."

The completed coach is mounted on springs consisting of 3″ Formed Slotted Strips bolted to 2½″ Strips fixed to the chassis. A short length of Sprocket Chain is secured to each of the springs, and those at the front are fixed at their other ends to Collars held on Threaded Pins inserted in the Double Angle Strip bolted to the Plate 3. The chains at the rear are bolted to 3″ Formed Slotted Strips secured to the floor of the coach. Steps are formed by 1″ × ½″ Angle Brackets.

Parts required to make model coach: 2 of No. 2; 14 of No. 5; 3 of No. 6a; 14 of No. 12; 2 of No. 12b; 2 of No. 12c; 1 of No. 15; 2 of No. 16; 2 of No. 17; 1 of No. 18a; 4 of No. 19a; 100 of No. 37a; 94 of No. 37b; 34 of No. 38; 4 of No. 48a; 1 of No. 51; 1 of No. 53a; 4 of No. 59; 1 of No. 62b; 4 of No. 72; 4 of No. 90; 12 of No. 90a; 1 of No. 94; 2 of No. 103f; 8 of No. 114; 2 of No. 115; 6 of No. 136; 2 of No. 190; 1 of No. 190a; 2 of No. 191; 2 of No. 212; 2 of No. 214; 6 of No. 215.

Our second model this month is a jolly roundabout that can be set in motion simply by turning a handle. It is shown in Fig. 2, and is quite easy to build. To make the base of the model, which should be first constructed, two 7½″ Circular Strips are spaced apart by two 12½″ Braced Girders that are bent round and secured by ½″ × ½″ Angle Brackets. A disc of cardboard is then bolted to the upper Circular Strip to form a platform. Two 7½″ Strips are fixed to the platform at right angles to each other, and are also attached to the Braced Girders by means of Angle Brackets. At their centres they are bolted to a Double Arm Crank underneath the platform and to a Double Bent Strip above it. A Boiler, complete with Ends, is also secured centrally to these Strips.

The canopy consists of a 6″ Circular Plate, to which is bolted a 5½″ diam. Circular Girder. A Bush Wheel is secured to the centre of the Circular Plate and is mounted on an 8″ Rod passed through the Boiler Ends and the reinforced bearings at the centre of the platform. At its lower end the Rod carries a 1″ Pulley, fixed with its boss lowermost and connected by a 6″ Driving Band to a ½″ fixed Pulley secured to a 7½″ compound rod. This rod is journalled in two 2″ Strips attached to Obtuse Angle Brackets bolted to the Braced Girders.

The operating handle is a Bush Wheel, to which a Threaded Pin is secured, and it is mounted on one end of the 7½″ compound rod. A Collar on the other end of the rod prevents longitudinal motion.

Six Hinges are spaced equally from each other and bolted to the flanges of the Circular Girder. A Rod and Strip Connector is attached to the other half of each Hinge and carries a 2″ Rod, the other end of which is fixed in the boss of a Rod Socket that is attached centrally to a Sleeve Piece forming the body of the horse. Three 1½″ Strips are bolted to each side of the Sleeve Piece to represent its legs and neck. Its head is a Coupling, which is secured to the other end of the Strips forming the neck, and the horse is completed by bolting a Flat Bracket to the rear end of the Sleeve Piece to form the tail.

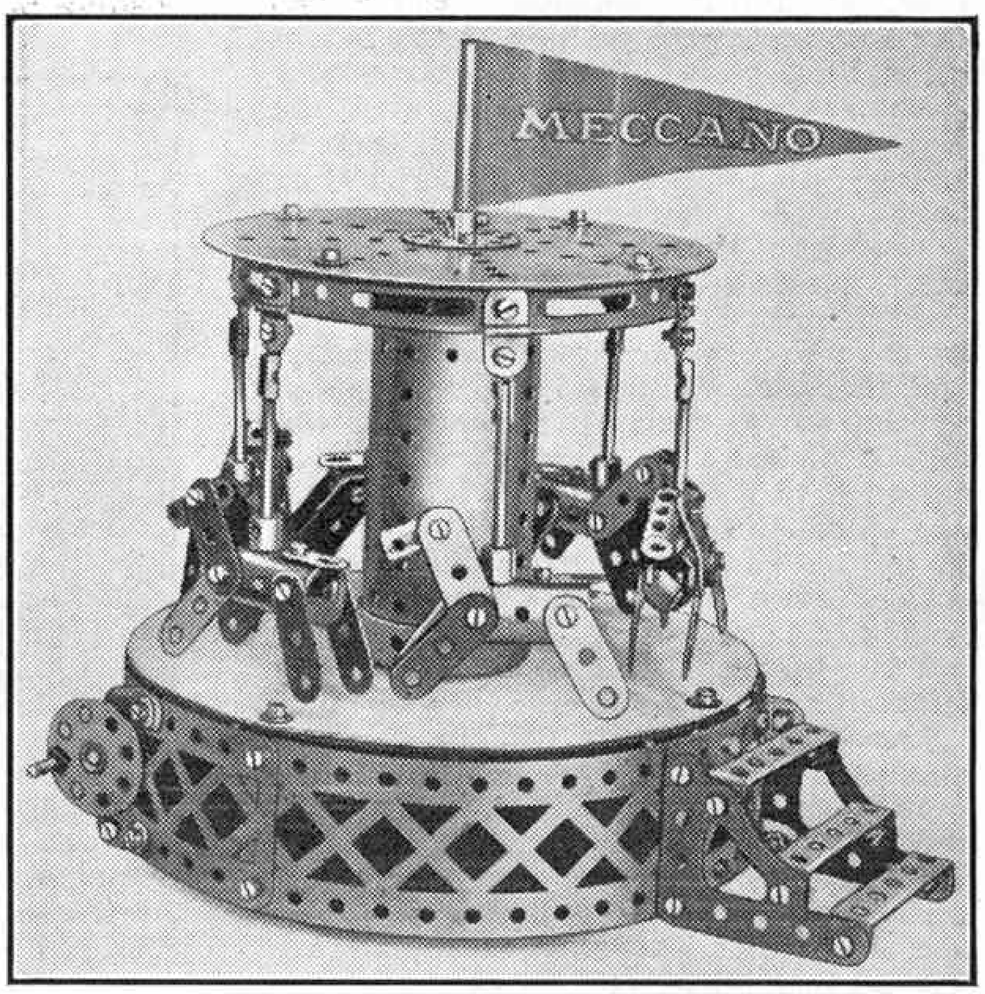


Fig. 2. This jolly model roundabout can be set in motion by turning a handle fitted in the base.

Steps mounting to the loading platform are formed from 2½″ × ½″ Double Angle Strips, which are bolted at their ends to Architraves that in turn are attached by Angle Brackets to the Braced Girders forming the surround of the base. A "finish" can be given to the model by attaching a pennant cut from paper to the 8″ Rod of the canopy. If the pennant is suitably coloured quite a gay appearance will be obtained.

Readers who have a Clockwork or Electric Motor of course can use it to drive the roundabout instead of rotating it by hand. Very little modification is required in order to substitute a Motor for the handle, but in this case it is important to make sure that all the movable Rods are in correct alignment so as to rotate freely in their bearings.

Parts required to build model roundabout: 2 of No. 1b; 2 of No. 6; 36 of No. 6a; 6 of No. 10; 12 of No. 12; 4 of No. 12c; 1 of No. 13a; 1 of No. 15; 1 of No. 16a; 6 of No. 17; 1 of No. 22; 1 of No. 23a; 2 of No. 24; 93 of No. 37; 18 of No. 38; 1 of No. 45; 3 of No. 48a; 2 of No. 59; 1 of No. 62b; 7 of No. 63; 2 of No. 99; 2 of No. 108; 6 of No. 111c; 6 of No. 114; 1 of No. 115; 1 of No. 143; 2 of No. 145; 1 of No. 146; 1 of No. 162; 6 of No. 163; 6 of No. 179; 1 of No. 186a; 6 of No. 212. 1 Circular piece of cardboard 7½″ diam.

Suggestions Section

By "Spanner"

(526) Flywheel Governor

("Spanner")

Most of the devices that are fitted to steam engines to keep the speed constant under varying loads take the form of a centrifugal governor. Another type of governor is illustrated by the mechanism shown in Fig. 526, and the manner in which it controls the engine also differs from the usual arrangement.

In this device a weighted arm is mounted "off centre" so that it is sensitive to

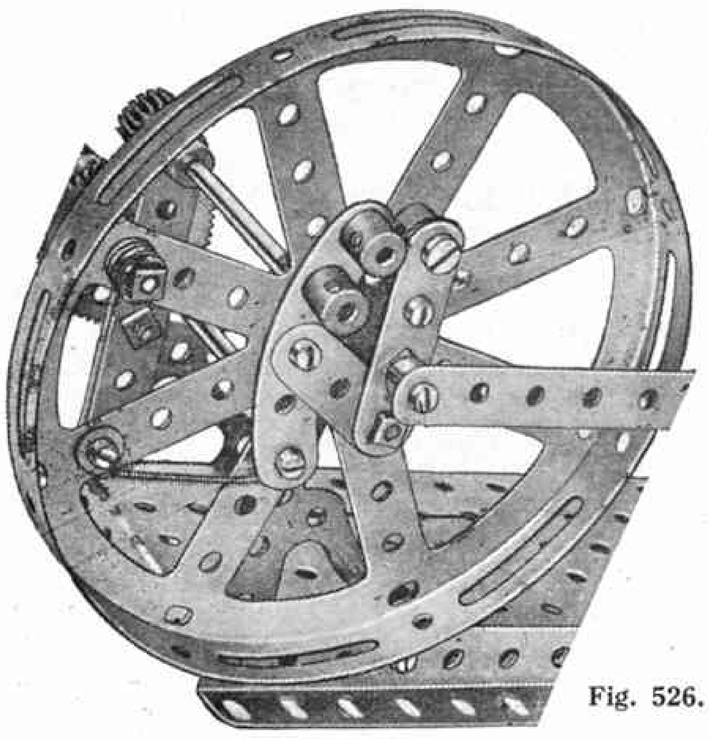


Fig. 526.

changes in speed of the flywheel. It is connected by a $1\frac{1}{2}$" Strip to a second pivoted Strip, which is attached to the slide valve rod. When the speed of the engine increases the end of the weighted lever flies outward, due to an increase of centrifugal force, and the lever is moved nearer the centre of the wheel, thus decreasing the radius of eccentricity of the point where the Strip is pivoted. This means that the travel of the slide valve shortens, and therefore the point in the stroke of the piston at which the admission of steam is cut off occurs earlier. The reverse happens when the speed decreases.

The Curved Strip is pivoted to a $\frac{3}{8}$" Bolt and spaced from the Hub Disc by Washers, and is prevented from flying outward too freely by a length of Spring Cord which is passed half-way round the pivot of the Strip before being fixed in place. The 2" Strip is bolted to a Crank that is free to turn on a Pivot Bolt secured to the Hub Disc.

(527) A Five-Speed and Reverse Gear-Box

(A. M. Simms, Bangor, Northern Ireland)

The compact gear-box shown in Fig. 527 is suitable for incorporation in model motor lorries, and provides five speeds forward and two reverse. The driving shaft is a $1\frac{1}{2}$" Rod, and it carries a 1" Gear 1. The other end of this Rod is inserted in a Threaded Coupling 2 that is fixed to a 1" Screwed Rod secured to the channel girders. The 1" Gear 1 remains in constant mesh with a 1" Gear 3 mounted on a 5" Rod 4 that is slidable in its bearings, and carries also another 1" Gear 5 and a $\frac{3}{4}$" Pinion 6. The 1" Gear 5 moves in and out of mesh with a 1" Gear 7 mounted on a $1\frac{1}{2}$" Rod journalled in the Threaded Coupling 2, and in another similar Coupling 8 secured to a 1" Screwed Rod attached to the girders. The $1\frac{1}{2}$" Rod also carries a 50-teeth Gear 9 that moves into engagement with the Pinion 6.

The Gears 7 and 9 are caused to engage and disengage a 1" Gear 10 and a $\frac{3}{4}$"×$\frac{1}{2}$" Pinion 11 respectively, mounted on a 5" Rod 12 that is slidable in its bearings. Rod 12 carries also a $\frac{1}{2}$" Pinion 13, and both Pinions 11 and 13 move into mesh with a 50-teeth Gear 14 and a 57-teeth Gear 15 respectively, secured to the driven Rod. The reversing $\frac{1}{2}$" Pinion 16 is free to pivot on a 2" Rod held in Handrail Supports screwed in the longitudinal tapped bores of the Couplings 2 and 8.

To engage top gear the Rods 4 and 12 are moved to the farthest limits of their travel to the right and left respectively, and the drive is transmitted through gears 1, 3, 5, 7, 9, 11 and 14. Slight movement of Rod 12 to the right disengages Pinion 11 and Gear 9, and Gear 10 goes into mesh with Gear 7, giving second gear. Movement of Rod 12 further to the right causes Pinion 13 to mesh with Gear 15, resulting in third gear. To engage the fourth and fifth gears the Rod 4 is moved to the extreme left, when the drive is transmitted either through gears 1, 3, 6, 9, 7, 10, 11 and 14, or 1, 3, 6, 9, 7, 10, 13 and 15.

The two reverse speeds are obtained by moving Rod 12 to the extreme right and Rod 4 to left or right, when the 1" Gear 10 meshes with the Pinion 16 and the drive is taken either through Gears 5 and 7 or 6 and 9.

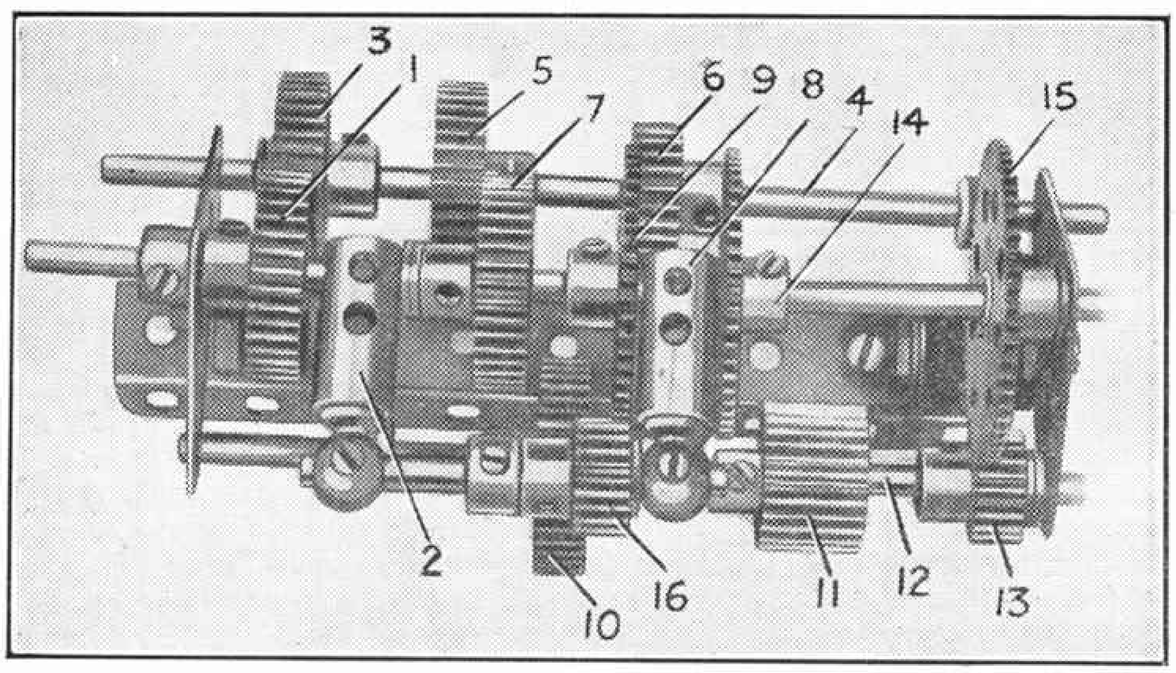


Fig. 527.

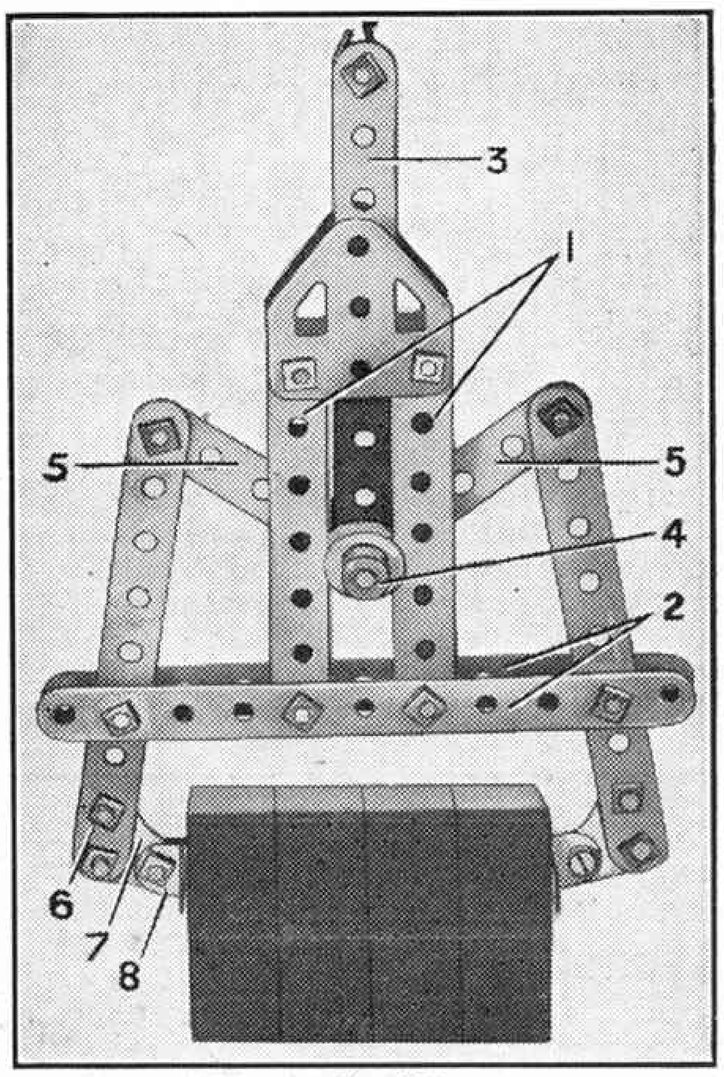


Fig. 528.

(528) Friction Grip Grab

("Spanner")

Fig. 528 shows a friction grip grab for use with model block-setting cranes. The $3\frac{1}{2}$" Strips 1, $5\frac{1}{2}$" Strips 2, and Flat Trunnions are in duplicate, and the two sides of the frame so formed are spaced apart by Washers and Collars. Two $4\frac{1}{2}$" Strips 3 secured to a Hook slide between the Strips 1, and they are guided by two $\frac{1}{2}$" loose Pulleys held in place, one on each side of the Strips, by means of Collars. The ends of two $2\frac{1}{2}$" Strips 5 are mounted pivotally on the axle 4 of the Pulleys, and are connected at their outer ends by bolts and locknuts to $4\frac{1}{2}$" Strips 6,

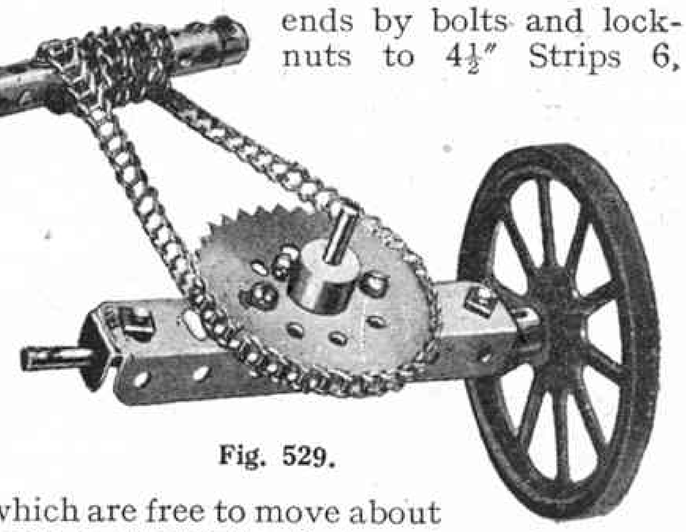


Fig. 529.

which are free to move about bolts in the Strips 2. A cord passes round one of the $\frac{1}{2}$" Pulleys and is secured to Strips 2.

When the cord is pulled the jaws of the grip open so that they can be placed one at each side of the block to be raised.

(529) Traction Steering Gear

("Spanner")

This example shows a form of steering gear that will be found very suitable for large model traction engines and similar models. The steering wheel is secured to a Rod journalled in Double Brackets bolted to the side frame plate of the tractor. It carries at its lower end a Worm engaging a $\frac{3}{4}$" Pinion on a horizontal Rod that carries several Couplings and Collars. The heads of the grub screws of these serve to grip a continuous length of Sprocket Chain that is wound five or six times around the Couplings and then passes round the 2" Sprocket on the front axle.

Meccano Model-Building Competitions

By "Spanner"

A Chance to Win a Cheque

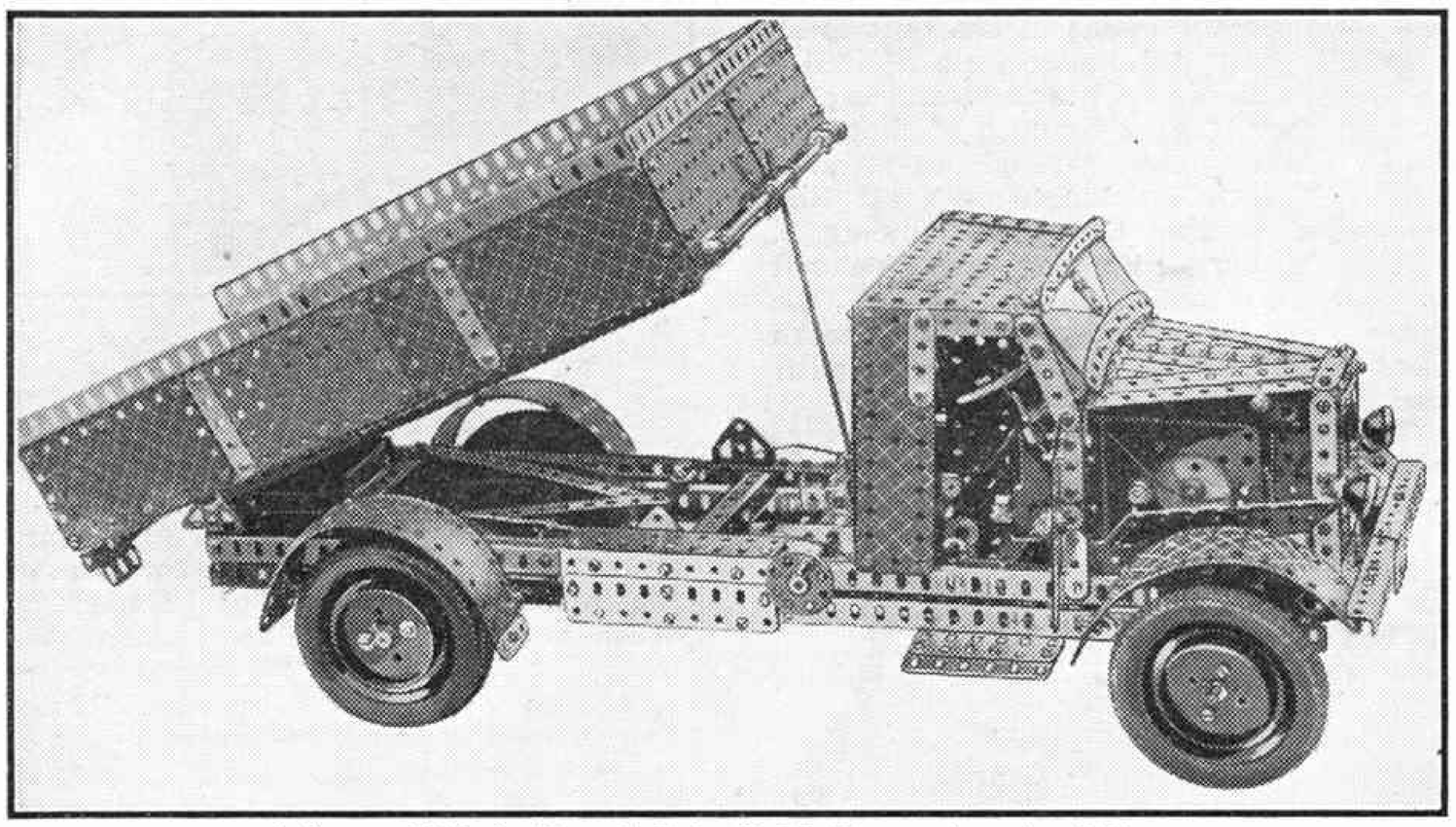
Every *"M.M."* reader who builds a Meccano model of any kind before 31st December next should enter it in our "Autumn" Model-building Contest, in which he will then have a chance to win a fine cash prize. Here are the full details of this Contest, the first announcement of which appeared in last month's *"M.M."* It will remain open for entries until 31st December, and readers of any age living in the British Isles or Overseas are eligible as competitors. Any type of model is suitable for entry and it may incorporate any number of Meccano parts. Each competitor should try and introduce in his model some ingenious use for a Meccano part or some novel movement, and models displaying originality of this kind, no matter how simple they may be, will stand the best chances of winning the prizes.

When the model is completed a photograph of it should be prepared, but if this is not possible a good sketch will do. The competitor's age, name and address should be written on the back of the illustration, and it should be sent, together with a brief description of the model, to *"Autumn Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."* That is all there is to do, but it should be noted that all models submitted must be the competitor's own work.

More than one model may be entered for the Contest if desired, but no competitor will be awarded more than one prize.

The following prizes will be awarded for the most interesting and well-built models submitted: First, Cheque for £2/2/–. Second, Cheque for £1/1/–. Third, Postal Order for 10/6. There will also be a number of consolation prizes.

Competitors who would like to have their photographs or drawings returned to them after the entries have been judged should enclose a stamped addressed envelope for that purpose. Photographs or drawings of prize-winning entries will not be returned.



A fine model tipping lorry built by R. W. Hearne, Annesley, Notts.

Prize-Winners in Recent Contests

"Summer Realism" Contest

In this competition, which was announced in the June and July 1941 issues of the *"M.M."* prizes were offered for the most successful Meccano models set in realistic surroundings built up in miniature outdoors. Some very interesting entries were received, and after careful consideration it was decided to award the prizes as follows:

1st Prize, Cheque for £2/2/–: G. Cooke, Cheadle Hulme; 2nd, Cheque for £1/1/–: R. Bailey, Chilcompton; 3rd, Postal Order for 10/6: A. Wilson, Girvan.

G. Cooke's entry consisted of a fine model steam navvy, of which he sent a photograph showing it at work excavating a mound of earth and shooting the spoil into a tipping lorry. The digger arm of the navvy is fitted with a built-up digger bucket and is operated by turning a handle situated in the jib. A Pinion mounted on the handle engages a compound strip bolted to the arm. Dummy boilers at the rear of the engine house are filled with Strips and serve as a counterweight.

A realistic scene representing operations at a pit head won the Second Prize for R. Bailey. Coal and slag are brought up in a steam-operated cage, and passed to an adjoining shed for washing and screening. The coal is then delivered by means of a shute into waiting lorries, and the slag is carried in a truck to the top of a nearby slag-heap.

Third Prize is awarded to A. Wilson, who submitted several fine models set in well-planned surroundings. One of these comprises a heavy army lorry towing a light artillery gun over rough ground. Another model is a giant lorry and a double-cranked trailer standing in a roadway. A heavy creeper tractor is being unloaded from the trailer.

"Derrick Crane" Contest (Home Section)

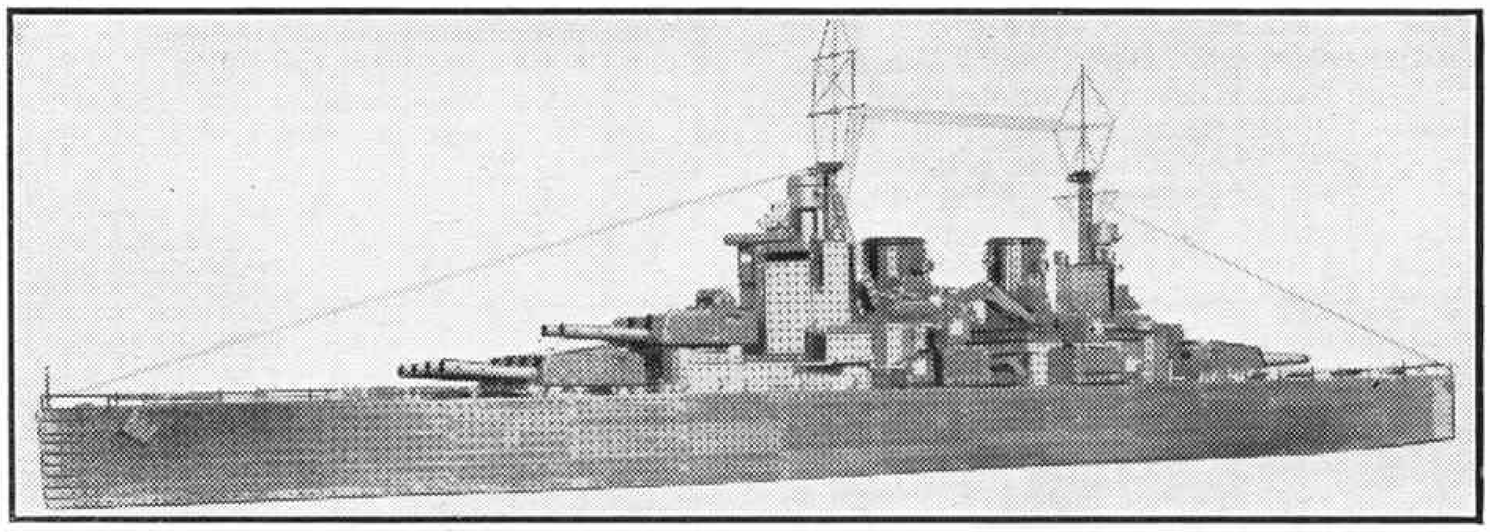
In this Contest prizes were offered to competitors who could complete an unfinished model derrick crane illustrated on page 256 of the August 1941 *"M.M.,"* using the fewest Meccano parts consistent with realism and sturdy construction. Many readers succeeded in completing the model successfully, but those named in the following list used the least number of parts, and they were awarded prizes as indicated:

1st Prize, Cheque for £2/2/–: D. Faulkner, London S.W.1; 2nd, Cheque for £1/1/–: P. Baker, Welwyn Garden City; 3rd, Postal Order for 10/6: C. Wrayford, Bovey Tracey.

Postal Orders for 5/–: R. Murphie, Fort William; K. Renshaw, Sheffield 2.

D. Faulkner incorporated a No. 1 Clockwork Motor in the gear-box of the crane, and a compact reversing gear for driving the hoisting and luffing drums. A ¾" Contrate mounted on the driving shaft of the Motor meshes with two ¾" Pinions, one of which is fixed and the other loose on a Rod journalled in Flanged Sector Plates. The hoisting and luffing drums carry ¾" Pinions that may be moved in or out of mesh with either of the Pinions.

Second and Third Prizes were awarded to P. Baker and C. Wrayford respectively. Each of these competitors fitted hand-operated mechanisms to their models. A novel feature of Baker's model is a built-up pulley block, consisting of a Channel Bearing carrying in its arms a loose 1" Pulley. The lower end of the Channel Bearing is attached to a small Loaded Hook. In Wrayford's model the jib is slewed by turning a Crank Handle situated in the rear end of the base.



This splendid model of H.M.S. "Duke of York" is over 7 ft. in length. It was built by J. Nowlan, Dagenham.

Club and Branch News

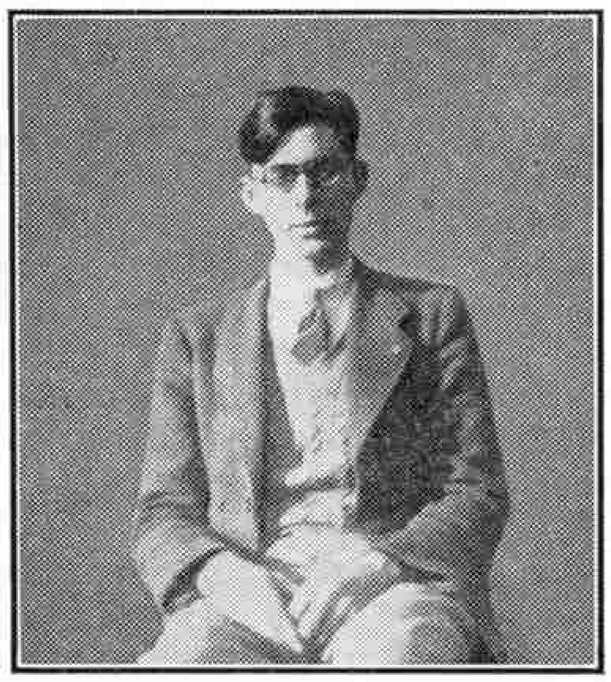
Allied Clubs and Branches

The illustrations on this page are noteworthy in that they are representative of combined Clubs and Branches. The Acton and Martinwhite organisations of course are not the only ones of this type, for it is natural for a Meccano Club to develop a Hornby Train layout; and members of Branches find Meccano so useful in building accessories that it seems the right thing to do to go further and introduce a model-building section. There is really no reason why every Meccano Club should not become a Branch of the Hornby Railway Company, and vice versa. The two hobbies fit in well with each other, and even where every member is not specially active in both hobbies there is sure to be a sufficient proportion interested in each to make the venture worth while.

There is no necessity to keep the two organisations separate. They can well meet in the same club room, under the guidance of the same officials; and it is easy to arrange separate times for the two hobbies, or indeed to carry on both at the same meetings. Leaders and Chairmen of Clubs and Branches that have not developed along these dual lines should give the matter their careful consideration.

Bright Ideas Wanted

One of the most gratifying features of Clubs and Branches is the originality and ingenuity displayed in their programmes. Nowadays these are soundly arranged on recognised lines, and from time to time bright ideas are put into operation that make proceedings more realistic and attractive, or add greatly to the excitement. There is an excellent example of this in the report from the Martinwhite Branch given on this page. This Branch has an extensive layout passing through several rooms, and a microphone has been fixed up in the control room so that running instructions can be transmitted by means of a loud-speaker to members stationed in the train room. This device is more than a convenience. When it is in use members cannot help feeling pleased with the manner in which a little difficulty has been overcome, and the success of the scheme is an encouragement to them to think out other bright ideas.



Mr. P. Martin is Chairman of the Martinwhite (Guildford) Branch, No. 402. This Branch was incorporated in August 1940, and under Mr. Martin's wise guidance has made excellent progress. Senior and Junior sections have been formed and both enjoy operations on an extensive layout well provided with accessories and lineside features. Model-building has been introduced and an associated Meccano Club is being formed.

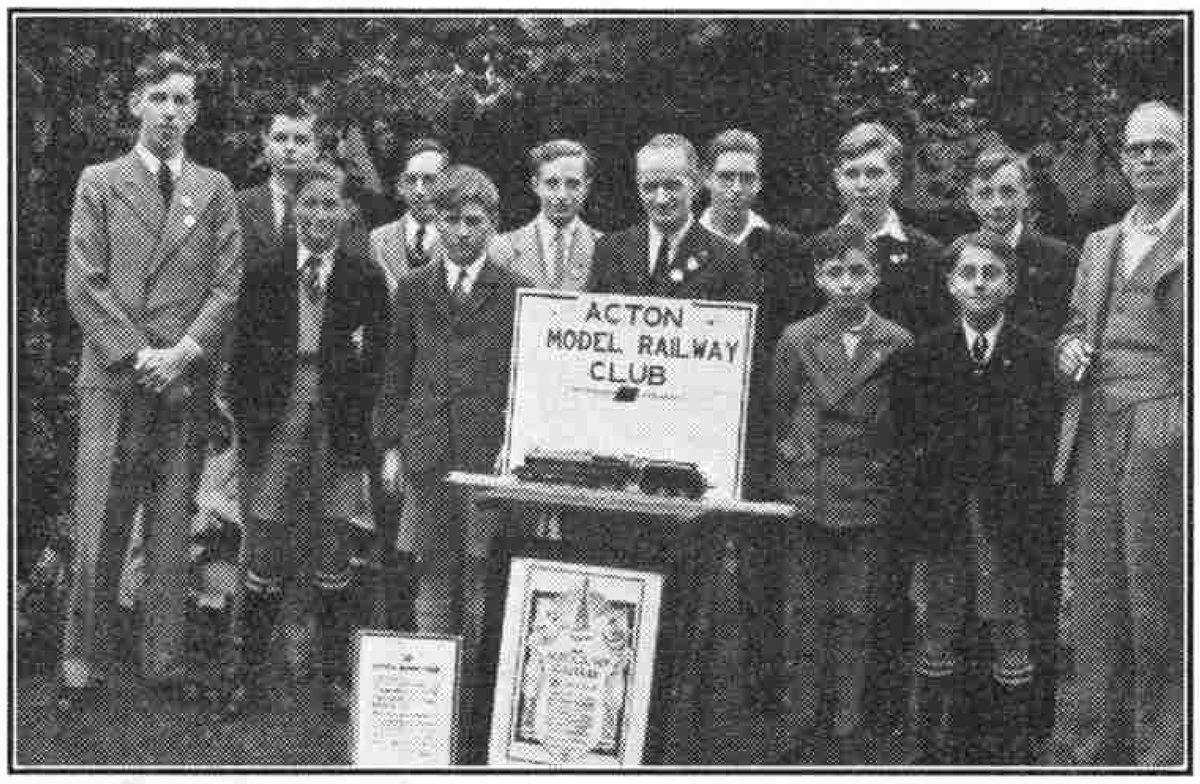
Examples of ingenious schemes of various kinds appear regularly in "*Club Notes*" and "*Branch News*," and indeed every issue of the Magazine contains useful suggestions for the introduction of practices that have been proved a success in actual use. For instance, this month there is a reference in the Waterloo (Dublin) Branch report to the overhaul of rolling stock in preparation for the intense traffic expected during the hop-picking season. Here is a hint to other Branches to keep seasonal activities in mind, and to make arrangements at the right time for reproducing local traffic of this kind. Another idea of a different kind is suggested by the practice, adopted by the Clapham Common Club and Branch, of giving National Savings books with savings stamps already inserted as prizes in model-building and other competitions, thus encouraging the savings habit. I want to hear of more ingenious ideas of these kinds, so that I can give examples in every "*M.M.*" issue.

Club Notes

Hillside (Whitefield) M.C.—Model-building Competitions have been held regularly, and a Visitors' Night was a great success. At one meeting members read humorous articles from books and magazines. Members are now busily constructing solid aeroplane models of balsa. A Lecture on the movements of a British armoured unit was illustrated by Dinky Toys models. A.R.P. instruction has been resumed, and the Club Library has again been opened. Club roll: 12. *Secretary:* D. I. Johnson, Burkewood, Hillside Avenue Whitefield.

Oakfield School (Newquay).—Meetings continue to be well attended. Special Model-building Evenings are being arranged for younger members. Aircraft identification contests are held, the highest score in one of these being 95 per cent. An epidiascope is being made for Club use. Reports of proceedings appear in the local press. Club roll: 12. *Secretary:* T. L. Higgins, Endsleigh Hotel, Bay View Terrace, Newquay, Cornwall.

Keswick M.C.—A successful Concert has been held, at which the sum of 16/7 was raised. Hornby Train operation has been added to the Club programme. A good layout has been built up and two locomotives are regularly in service. Club Roll: 6. *Secretary:* J. Lees, Woodside, Chestnut Hill, Keswick, Cumb.



Members of the Acton M.C. and Branch, No. 308, with Mr. J. H. Statham, Leader, in the centre of the group. Mr. F. T. Mothersole, Vice-chairman, is on the extreme right, and Mr. S. W. Simmons, secretary, on the left. Intense model-building activity is a special feature of club work, competitions with set subjects being arranged regularly, and work is now in progress on a large well-planned Hornby Train layout. An excellent Magazine containing Club and Branch news and interesting articles also is produced.

Hornsea M.C.—A varied programme has been followed. Lectures on scientific subjects, including botany, have been given by Mr. A. Tawn, Assistant Leader. A special discussion group has been arranged for the benefit of Club lecturers and older members. The Hornby Railway has been laid out in the Leader's garden for open air operations. Cinematograph Shows have been given, and enjoyable Cycle Runs have been arranged. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

Totnes M.C.—Model-building activity has been intense, interesting models constructed including a clock, a machine gun, and three excellent lorries. Gear boxes, clutches and Ackermann steering gear also have been built up. Darts and Monopoly continue to be played, and at one interesting meeting special articles from recent issues of the Magazine were reviewed and discussed. Club roll: 15. *Secretary:* T. Macnamara, "Gables," Totnes.

AUSTRALIA

Melbourne M.C.—Interesting model demonstrations have occupied several meetings. At one of these a large crane was operated, and at another all members enjoyed the fun of working a large model of a grain elevator. On the Club's model railway time-table working has been carried out with success. Locomotives have been tested and tracks cleaned, automatic couplings adjusted and other maintenance work completed. Mr. L. Ison, Leader and Secretary, gave a talk on his railway trip through the Blue Mountains. Club roll: 12. *Secretary:* L. Ison, 8, Hayes Street, Northcote, N.16, Victoria, Australia.

NEW ZEALAND

Spring Creek (Marlborough) M.C.—Meetings continue to be well attended, and both Model-building and Hornby Train operations are carried on. At one meeting four-wheeled model trucks were built by members, who had great fun making use of them for various purposes. A wide range of Games also has been played. Club roll: 10. Leader: Mr. L. Sharp, Post Office, Spring Creek, Blenheim, Marlborough, N.Z.

Branch News

Acton.—The Gauge 0 track has been relaid to allow both continuous running and operations from terminus to terminus. A loopline and additional sidings have been brought into use. Maintenance work is carried out continuously in order to ensure smooth running. Model-building also has been enjoyed, and Games, including Bagatelle, Rings and Table Skittles, add to the excitement of Branch meetings. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Barnard Castle.—A fine Exhibition has been held. The track in use was the result of extensive experiments and was given a realistic appearance by the lavish use of scenery. The layout represented a night scene, with both track and surroundings illuminated. Additional engines and other equipment have been obtained. A Branch Rugby Team has been formed. A feast also has been enjoyed, at which Dr. H. C. Woods, Chairman, kindly supplied welcome refreshments. *Secretary:* R. Churchill, The School, Barnard Castle.

Martinwhite (Guildford.)—Excellent progress has been made, members attending regularly. The Dublo track is very popular, and a lengthy Gauge 0 layout also has been arranged outdoors. Solid steel track has been introduced. An interesting enquiry followed a crash in which the miniature "*Royal Scot*" was concerned. At one meeting a microphone was placed in the control room and connected to a loudspeaker in the train room. These were used for giving running instructions. Colour-light signals are being introduced. Model boats are popular with members, and at one meeting members enjoyed a trip on the river in a large skiff. *Secretary:* T. M. White, Bingham Stoke Road, Guildford.

Clapham Common.—Mr. E. Butcher, Chairman, has resigned owing to pressure of duties as A.R.P. Warden, and Mr. S. Salmon, the first Chairman of the Branch, has kindly taken up the post again. The Annual Exhibition was very successful; the prizes in various competitions consisted of National Savings Books with stamps in them. Refreshments were enjoyed and a collection realised the sum of £1 10s. 2d. Lectures have been given by members on "*Railways*," and "*British Warships*." The track has been relaid and enjoyable operations have been carried out by both Senior and Junior Sections. A station has been built of Meccano and scenery is now being constructed. *Secretary:* K. Maycock, St. Barnabas' Vicarage, Lavender Gardens, Clapham Common, London S.W.11.

Waterloo (Dublin).—A new timetable has been arranged, and rolling stock was carefully overhauled in preparation for intense traffic during the hop-picking season. This is a realistic touch; for the Branch layout represents the line of the Kent and East Sussex Railway. Part of the track has been relaid. *Secretary:* S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

Hayes (Bromley).—Meetings are held twice weekly. The Branch track is steadily growing as new rails are obtained. Good use is being made of scenery to give the layout a realistic appearance, and a "river" is crossed by means of a Meccano Bridge. Outdoor events have included tracking on the Common, which proved great fun. *Secretary:* J. W. Pooley, 15, Pickhurst Lane, Hayes, Bromley, Kent.

Folkestone.—Meetings have been devoted to shunting operations. A new track is now to be constructed. This will be mounted on a bench at a height of about 3 ft. Junction Signals are being installed, and new timetables are being worked out in preparation for intensive operations. Smart running is a feature of the operation of "Boat Trains" between "Folkestone" and "Victoria." A fine model of a fishing smack has now been completed and tried out with success on the local park pond. *Secretary:* E. Saunders, 79, Dover Road, Folkestone.

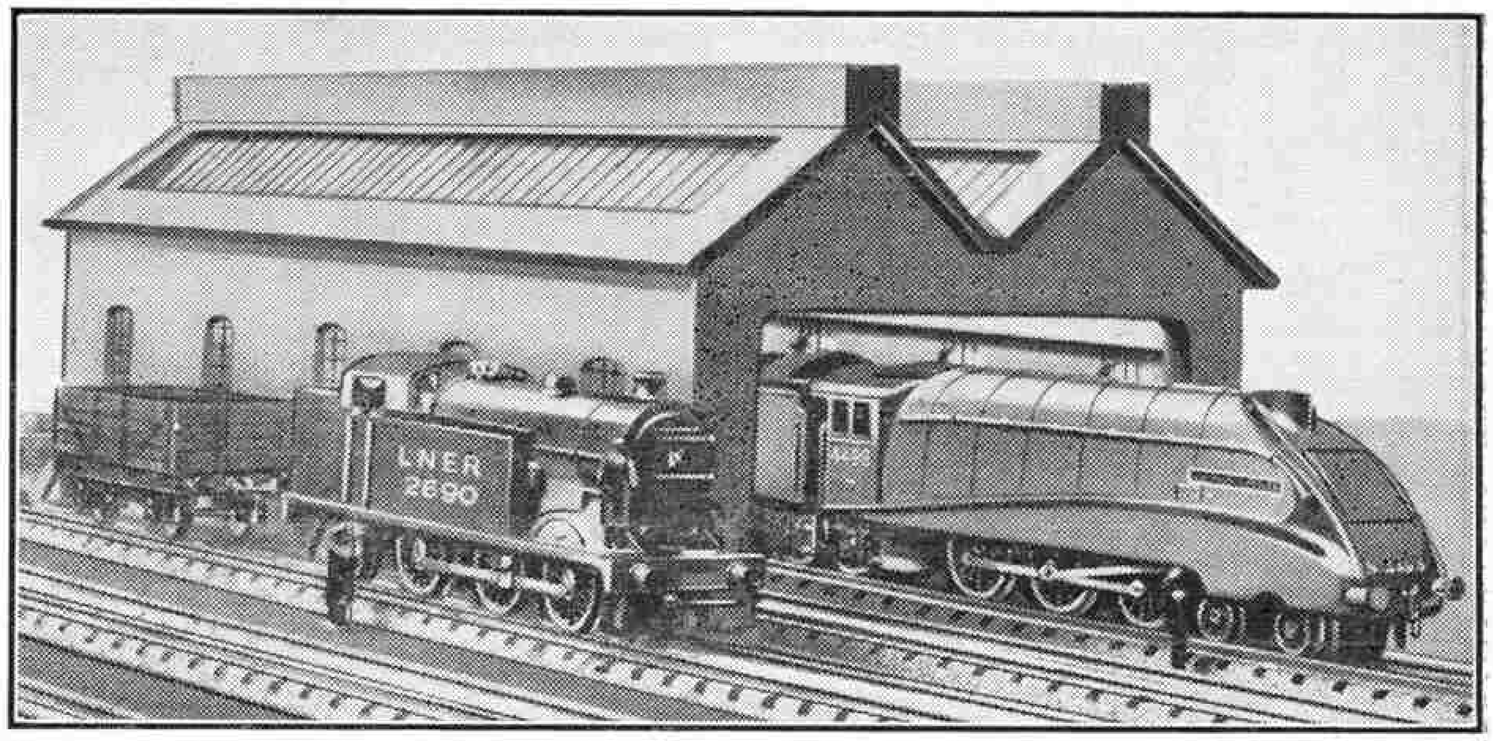
Hornby-Dublo Locomotives at Work

IN these pages last May we dealt with Hornby-Dublo Locomotives "at home," describing the Engine Shed of the Dublo Range, its use, and the various possible ways of arranging locomotive depots and yards. This month, by way of contrast to the stabling arrangements of our engines, we consider their work "on the road."

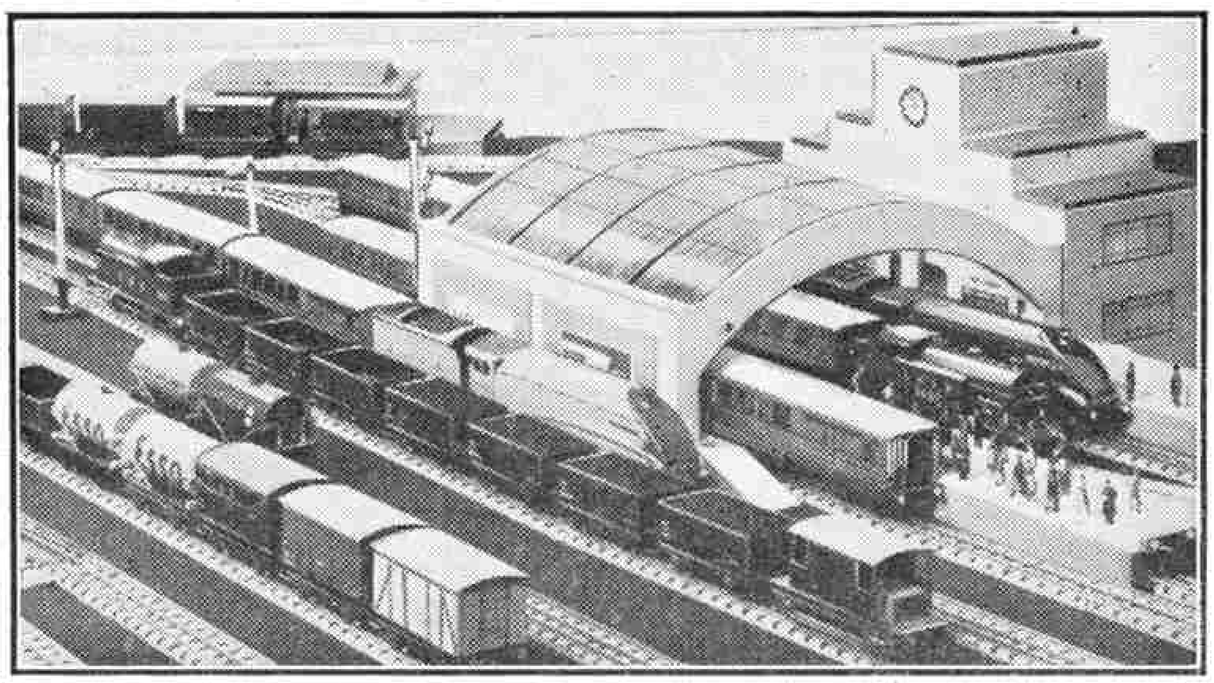
As most readers will know, there are two types of locomotives available in the Hornby-Dublo Series, the 4–6–2 streamliner "*Sir Nigel Gresley*" and the standard 0–6–2 Tank engine. It is surprising what a wide range of duties these two can be made to cover by a suitable arrangement of the trains. In actual practice even a 4–6–2 does not spend the whole of its time hauling important expresses, nor does a tank locomotive confine itself to the working of purely local goods trains. In miniature therefore we can take advantage of this fact to deal with the different kinds of trains that we want to run on our Dublo railway.

We will begin our working period with our engines in the Shed and suppose that the first one required is a Standard 0–6–2 Tank. The first move is to bring the engine from inside the Shed building and let it stand in the yard. Here we should take the opportunity of "going round" it just as real drivers do. Probably the most that will be required will be a light dusting, which can be done very effectively with a small paint brush kept specially for the purpose; and a drop of oil on each of the coupling rod pins, which should be applied by means of the dip stick provided in the bottles of special Dublo oil.

The engine is now ready to begin its work. We will suppose that it is early morning, and the first job is to run down the line "light" and couple up to a set of coaches standing in a siding at a wayside station. On miniature railways it is often necessary, because of the restriction of space, to store coaches in this way. One advantage is that it distributes the stock to a certain extent, and vehicles are ready at different points to start working with the least possible shunting and moving about. In our case the train consists of a Corridor Coach D1 and a Twin-Unit Articulated set. Our engine draws up at the Signal Cabin overlooking the siding points. Then the points are set, and the engine runs into the siding and gently couples up to the waiting vehicles.



Hornby-Dublo Locomotives "at home." Note the busy miniature railwaymen attending to the engines before their day's work.

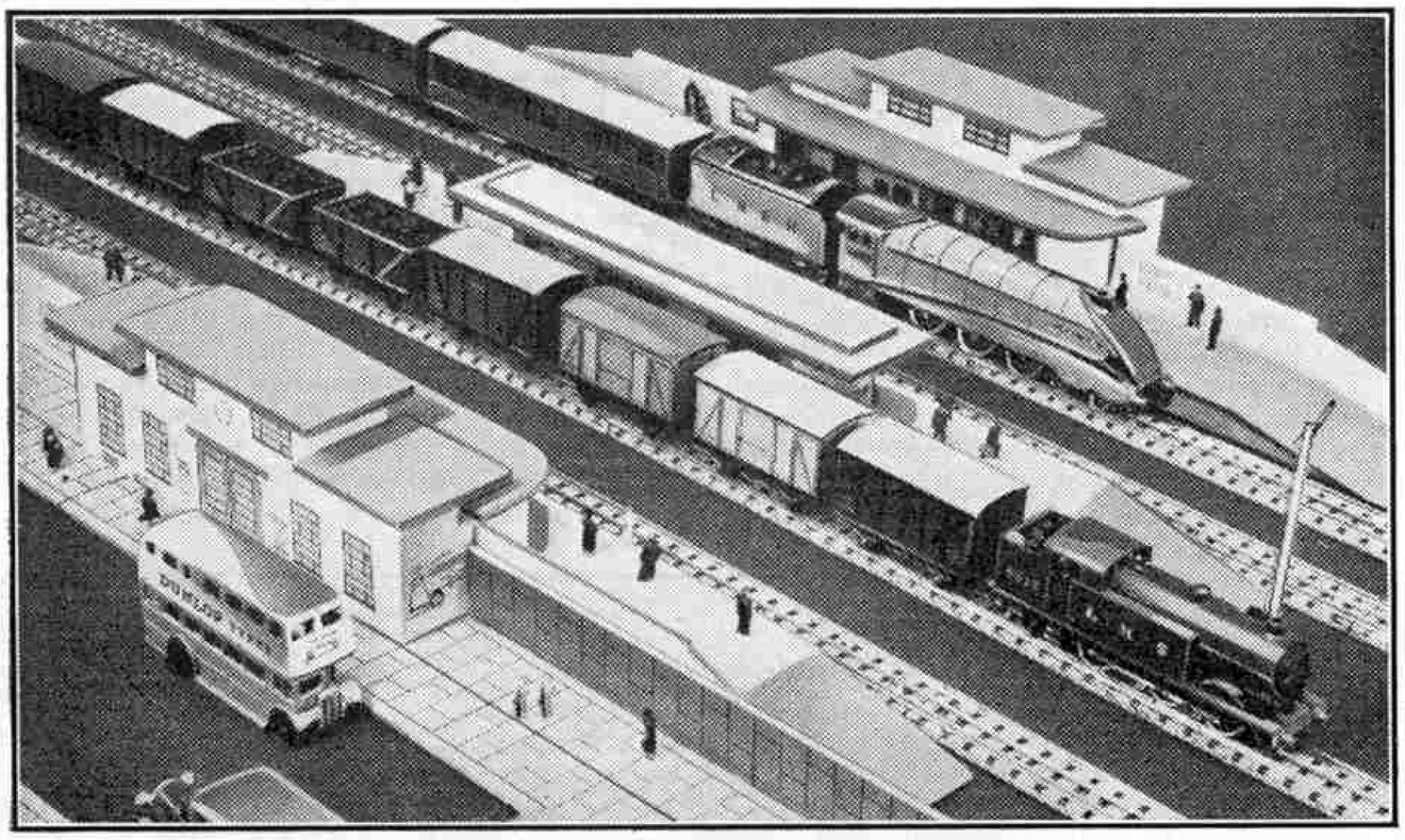


Hornby-Dublo Locomotives are here shown on a variety of duties. There are Tank Locomotives on both passenger and goods trains, while a "Pacific"-hauled express is on the avoiding line outside the station.

Although the train is formed of corridor stock, and it is required at the terminal station to form an early main line outgoing train, the "Traffic Department" take advantage of this movement of the coaches by making use of them as an early stopping train into "town." This is often done in real practice, and it is a very useful arrangement to follow up in miniature, as it allows the greatest possible amount of running to be obtained with a limited number of coaches. Our engine therefore draws the train out of the siding and runs it alongside the station platform.

After loading up, for even at this "early hour" the station is well peopled with Miniature Passengers, following the hints given on this subject last month, our train starts off for the terminus and comes to rest alongside the platform devoted to local traffic. There we should finish with the train if its next journey were to be on an outgoing local service. But as it is to form a main line train, and we have run in on the "Suburban Side", we now have to push the coaches out of the platform after our passengers have streamed away. We move out far enough to clear the crossover points, and when the road is clear reverse into the station again, bringing the train this time alongside the main departure platform.

The train should not be run right up to the buffer stops, but after uncoupling the engine should be moved away from the train a short distance. This prevents the couplings re-engaging when the engine that is to work the train out backs on at the other end, and perhaps moves the coaches back slightly in doing so. In order to carry out this working on an electrically operated line it is necessary to have short lengths of track at the inner or buffer stop ends of the rails, forming separate electrical sections that can be "isolated" from the rest of the main line, as we have previously suggested



A pick-up goods train on a Hornby-Dublo layout headed by a Standard 0-6-2 Tank. This type of working is referred to in this article.

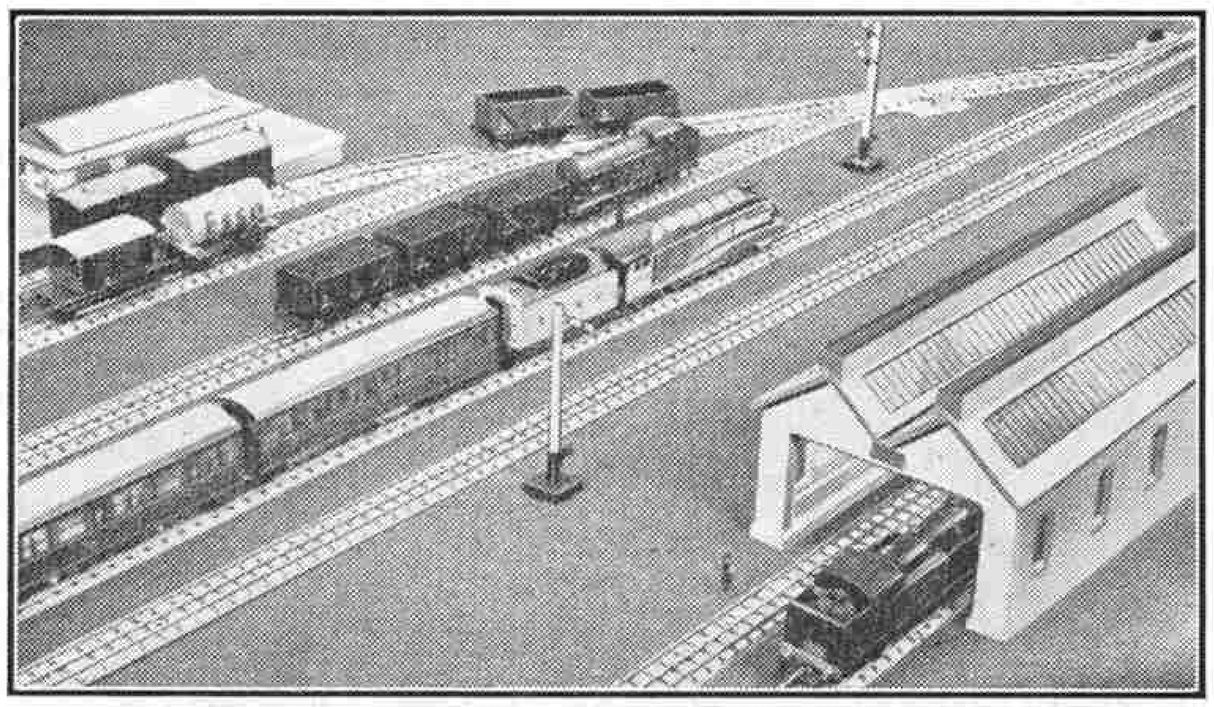
in these articles. Thus the Tank engine comes to rest in one of these sections after being uncoupled, and the section is then "switched out" or isolated, so that this engine does not move when the other one comes on to the same platform line.

Now it is the turn of the 4–6–2 *"Sir Nigel Gresley,"* which when ready comes backing down from the Shed with the slow dignity that all big engines seem to affect when they are coming to the terminus to pick up their trains. This gentle running is quite possible with the perfect control that is a feature of the Hornby-Dublo system for electric trains.

"Sir Nigel" backs on to the waiting train, coupling automatically by means of the very effective couplings provided on all Dublo stock. After a slight pause the train departs and proceeds on its way along the main line. Probably it will make several stops, and at one of them there may be a Van to be picked up and added to the train for conveyance to the same destination. The train engine can quite conveniently carry out the necessary shunting work. Here for the time being we can leave the long-distance train as it carries on down the main line.

After the departure of the express the Tank engine that we left "isolated" in the terminus can be worked out of the station and perhaps run into the goods yard near to it. Here it may be required to do some shunting, unless there is another engine of the same type already engaged on this work. The actual arrangement of engine duties in relation one to another depends on the number of engines available on the line and differs on every layout. We will suppose, however, that when a train is ready our Tank engine has to work it out along the line, calling here and there to put off or pick up various wagons. We have some empty vans perhaps, together with a few loaded coal wagons for distribution to local stations or sidings, just like the mixed goods train shown in the upper illustration on this page.

As it will take some time to work this load along the line, it is likely that the express we were dealing with before will already have reached its destination. In these days of quick turn-rounds both for engines and stock it will soon be on its way back again. We say "back again" although on many model railways, owing to space restrictions, trains actually arrive at the same station that they start from!



An express hauled by 4-6-2 "Sir Nigel Gresley" passing a yard where shunting is in progress. In the foreground is a 0-6-2 Tank by the Engine Shed.

Whatever the arrangements are we shall probably have the express train and the goods train at "opposite ends" of the system by now. After shunting its train to the terminus carriage sidings, the streamliner will perhaps go to the Shed for a short period for "coal and water" in the manner suggested in the engine shed article last May. Then, as express engines cover a big mileage nowadays, it will be ready to take another down express from the terminus. Possibly the same coaches will be used again, or the make-up of the train may be altered for the sake of variety.

So the 4–6–2 starts off once more, on a non-stop run we will suppose, to the destination where the Tank engine now is. The Tank Locomotive will have disposed of its train, and can assemble a train of Vans to represent a cargo of perishable traffic. Thus when the 4–6–2 comes in the two engines can exchange duties, the streamliner taking charge of the train of vans, while the 0–6–2 makes its return trip with the passenger coaches on a stopping train service. On their final arrival at their destination each engine can then make for the Shed with a "day's work" to its credit; but on the way the hard-working Tank can work out the passenger coaches to the passing station where it began work at the beginning of this article.

Similar arrangements and numerous variations can be practised almost without limit on Dublo railways, the exact sequence of operations depending on the ideas of the "General Manager" of the line and the material that he has at his disposal. On certain turns of duty for example, the final trip of the Tank Locomotive might be made with the train of Vans, the 4–6–2 then remaining on passenger work. The Van train could run thus at certain intervals, as if representing a short-distance service provided to meet local market requirements, or it might be operated as an additional train. This might make an extra "round trip" for the busy 0–6–2 Tank and might also affect the empty working and storage arrangements of the passenger vehicles.

Running Hornby Goods Trains

IT is curious that so many miniature railway owners, at least in the earlier days of the development of their layouts, appear to neglect the running of goods trains. Possibly this is because we have all travelled by passenger trains and are more familiar with their working. Goods trains naturally are not so smart in appearance, they appear to run at awkward times, and they seem to do a lot of aimless running about at our local station yard when shunting.

As we improve our knowledge of goods train working, however, we find that there is a great deal of interest in the subject. So we begin to reproduce various operations in miniature on our own railway systems. We find that slight alterations or additions to the track formation will make shunting movements easier at one place, or that the rolling stock requires to be added to so that different kinds of traffic can be conveyed. Then there are items connected with goods traffic such as Goods Platforms, Loading Gauges and other details that make the goods yard more complete and realistic.

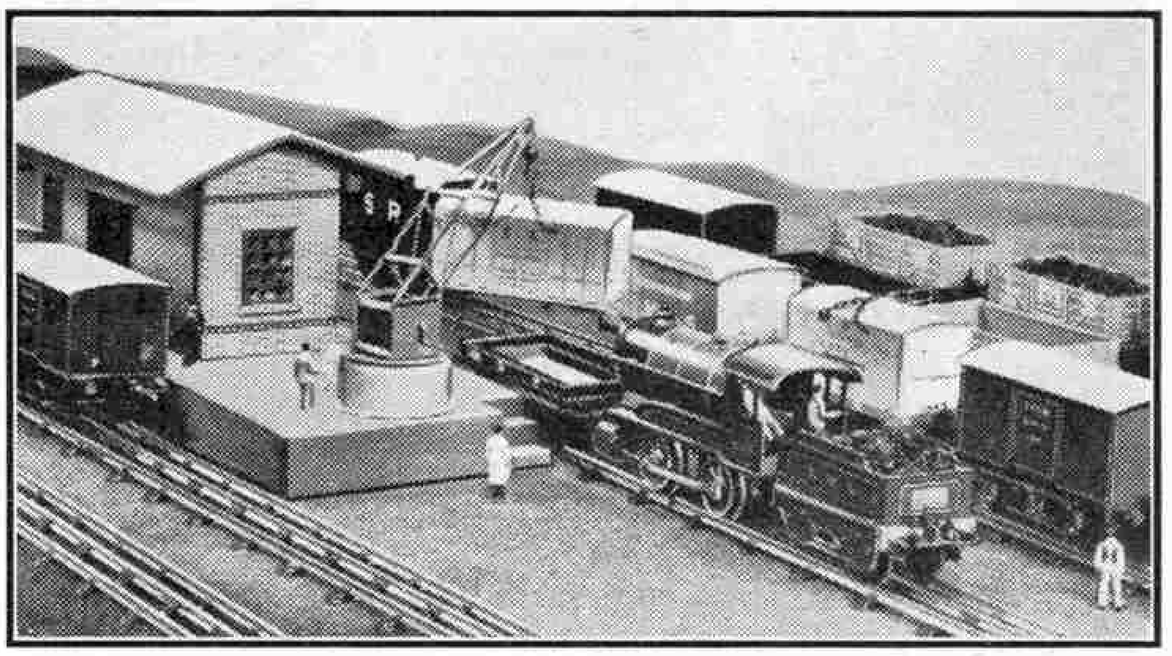
Again there is the subject of loads for miniature goods wagons. Loads can be as varied and interesting as the vehicles themselves, and in addition to such things as can be bought, such as Hornby Imitation Coal and Hornby Bricks, there are numerous little odds and ends to be found in most households that can be used or adapted as loads. Matchboxes can serve as large packing cases, cotton bobbins can be used as kegs or drums of different kinds. There is practically no end to the variety of loads that can be made up with the exercise of a little ingenuity and imagination.

Open Wagons are really the best vehicles for miscellaneous loads of this kind, and the "goods" can be protected from the "weather" by a Hornby Wagon Tarpaulin in just the same way as real wagon sheets are used. But those who have a number of Vans with either sliding or opening doors will of course want to use them. Loading these vehicles is fairly easy, but unloading becomes more or less a problem according to the size of one's fingers! Armed with a Hornby Shunter's Pole, however, or some similar "weapon" bent up out of thin wire, we find that we can persuade most of our boxes, barrels and so on out of the corners of the Van and on to the Goods Platform.

The conveyance of our loads from point to point on a large system is quite good fun, as it is also on a small system where the train returns to the same yard or Goods Platform after a circuit of the track. As a variation of these operations the resorting of loads at certain stops and the transfer of packages from one vehicle to another is quite interesting, and imitates the transhipment of loads that regularly takes place at various centres in real practice. The object of this transferring is to arrange as far as possible the conveyance of full wagon loads to a given destination.

This working in turn necessitates the shunting and re-marshalling of the vehicles concerned so that they may travel in the order required according to their destination. Thus a wagon that is to be put off the train at the next stop will be just behind the engine in the train, and so on. Shunting work in miniature can be very entertaining, and to carry it out efficiently requires some skill on the part of the operator. Engine movements of course are simple to manage where Hornby Electric Locomotives with automatic reversing mechanism are in use. Similarly the assembly of a train presents no difficulty, as the automatic couplings in general use on all Hornby Rolling Stock engage one another as the wagons are pushed together by the engine. The "engineman" however has to be careful not to bump into the stock too roughly. "*Shunt with care,*" an instruction frequently seen chalked on real wagons, is just as necessary in miniature and is an excellent principle to observe at all times.

When breaking up the train some deft work with the Hornby Shunter's Pole is necessary, especially if the vehicles are uncoupled "on the run." It is necessary to see which of the coupling loops of adjacent wagons lies underneath the other; this is then raised by the Shunter's Pole and so lifts the upper coupling loop clear of the hook. The Pole must now be kept separating the two loops. When this stage in the operations is reached the engine should be retarded smartly and then reversed; the uncoupled wagon will then run along on its own for a short distance. The vehicles must naturally be in a free-running condition, with axle bearings oiled and with no binding of the axle guards or wheel frames on the wheels. The best results are naturally obtained with stock fitted with die-cast wheels.

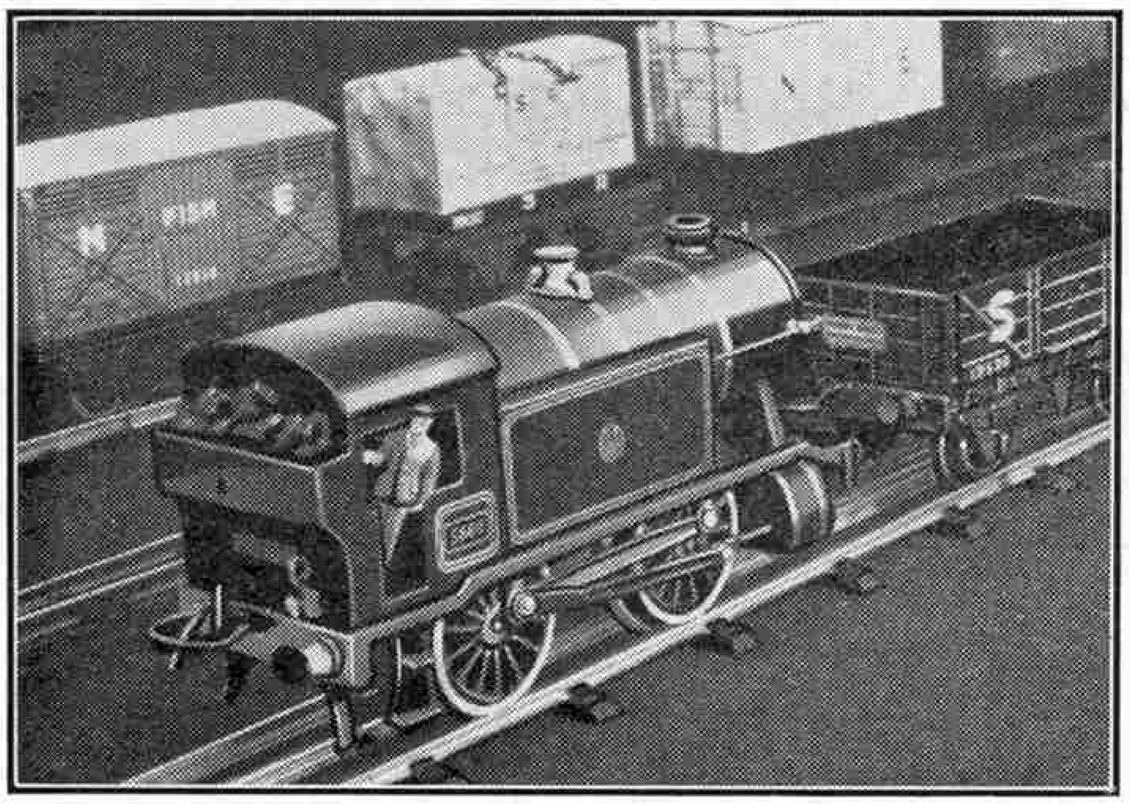


Work at a country goods depot on a Hornby Railway. The Container is being slung in a realistic manner by the Goods Platform crane while the engine moves the Flat Truck ready to receive its load.

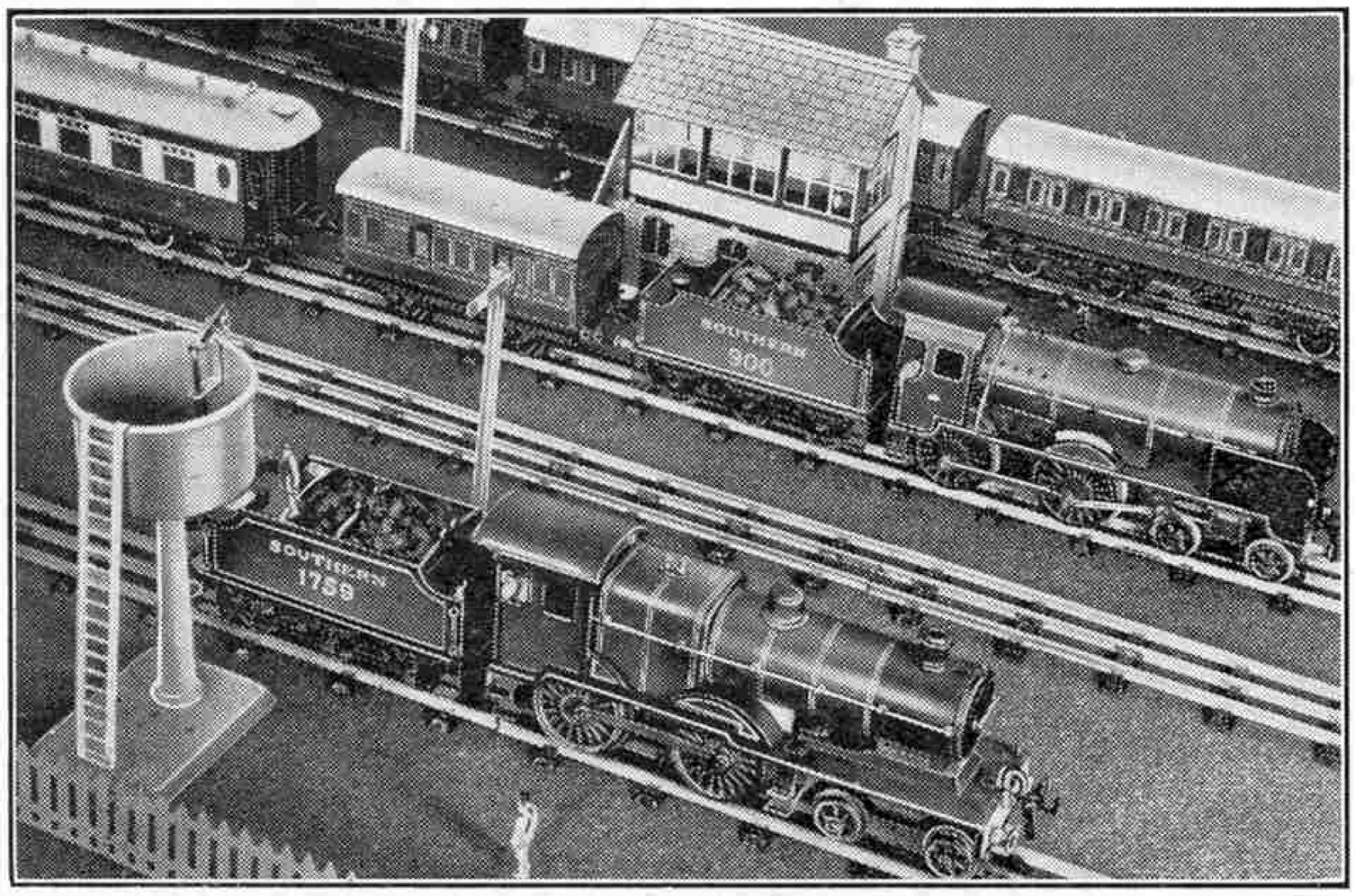
Quite good results can be obtained in shunting and marshalling work with clockwork-driven locomotives. The mistake is commonly made of attempting to carry out the operations with the locomotive too fully wound. This results in too high a speed, especially when there are perhaps only three or four wagons to be moved at a time. The engine should be wound just sufficiently for each movement there and back along the sidings. This will keep its speed reasonable, and avoid the disappointments sometimes experienced with derailments, couplings jamming and so on, when too rapid movements are attempted.

Braking and reversing of the locomotives by hand is essential so that this can be "timed" correctly in relation to the handling of the Shunter's Pole. It is quite a reasonable practice to keep one's fingers lightly on the brake and reverse rods in the engine cab when carrying out operations of this kind. It will steady the engine if it tends to run too fast, and the working of the brake or reverse mechanism can be carried out smoothly just when required. With practice in fact one develops a great degree of delicacy in handling the engine in this way and complaints of "rough shunts" will be few and far between.

The type of locomotive to be used on shunting duties will depend largely on what engines are available on the line. Generally speaking a non-bogie engine is to be preferred, and a tender locomotive also tends to be cumbersome in a small yard. If, however, the engine that makes the main line journey with a train has also to perform its shunting, it may be necessary to employ either of the two types mentioned. If an engine can be reserved for shunting, the Hornby E120 Special or No. 1 Special Tank is probably the best.



A Hornby E120 Special Tank shunting. This type of engine is ideal for work of this kind owing to its powerful yet compact design.



In the foreground an "L1" class engine "takes water."

Southern Suggestions for Hornby Railways

IT is some time since we dealt with matters of special interest to those who follow the practice of the Southern Railway. In this article we describe various features that may have been overlooked by older readers, and that may be useful also to those who are in the earlier stages of developing a Southern system on true-to-type lines.

The S.R. is a system with individual features in many respects and with various interesting traffic and operating characteristics. Those who live on or near the system may be well acquainted with the various features of their favourite line, but others who are not in the Southern area, but who prefer that line for one reason or another, may not have the opportunity of keeping in touch with the system except at rare intervals.

Naturally war conditions have done away with the glamour that formerly surrounded the Continental Boat Trains, or "the boats" as they were familiarly known to the staff. In miniature however most Hornby Railway owners will probably prefer to represent the various services as they were, in view of the special interest attached to them. It is difficult of course to imagine how the services will be arranged when normal conditions return, so that it is scarcely possible to anticipate future developments in the same way as can be done with many ordinary main line trains.

Normally then the most important train on a miniature S.R. Eastern Section would be *"The Golden Arrow,"* in its best days an all-Pullman express from Victoria to Dover, the return journey being made from Folkestone. This gives a splendid reason for the employment of the well-known Hornby No. 2 Special or No. 2 Pullman Coaches to form a completely vestibuled train. Alternatively the make-up might be varied by the inclusion of standard S.R. No. 2 Corridor Coaches, this representing the state of things when the number of boat passengers did not justify a complete train of each kind of stock.

First choice in motive power for a miniature *"Goldon Arrow"* would probably be the No. 3 type of Hornby locomotive bearing the name *"Lord Nelson."* On the other hand some miniature railway owners who have the true-to-type *"Eton"* model may prefer to use this as being more representative of up-to-date S.R. standard practice. *"Eton"* in fact is a very fine engine as the illustrations on this page show, and it can quite reasonably be used on a wide variety of duties.

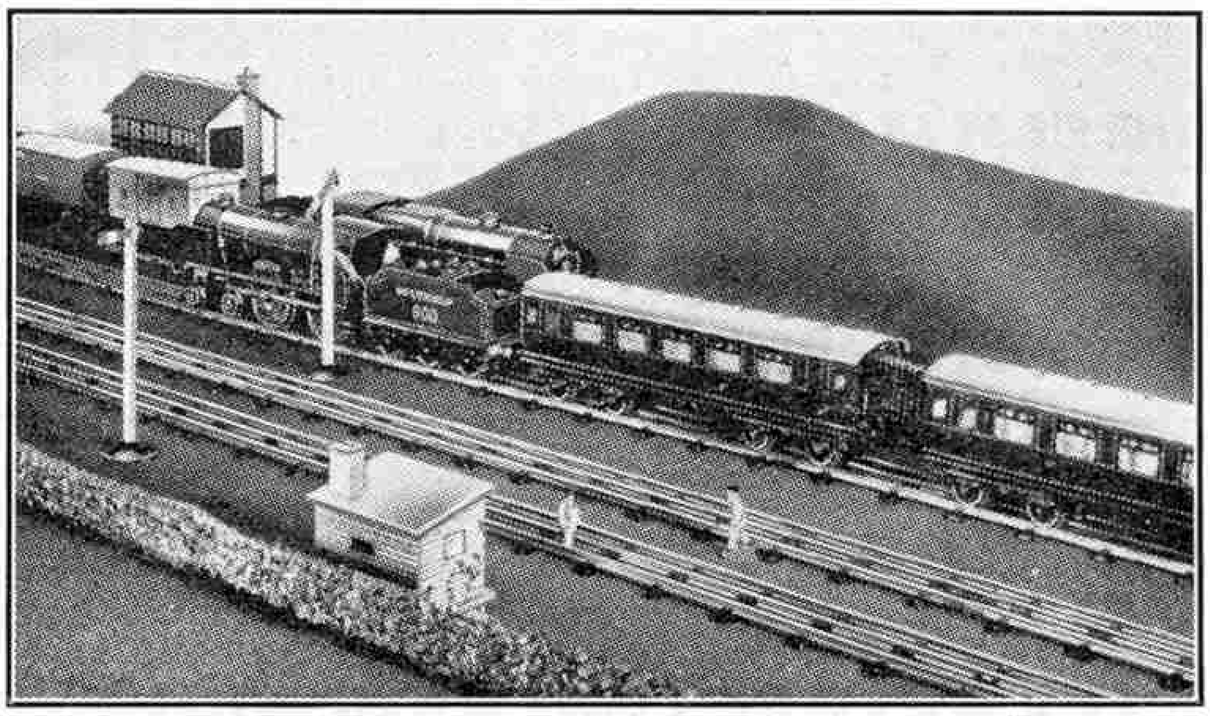
A specially appropriate job on which the real "Schools" locomotives are used is the haulage of the numerous "Kent Coast" expresses. In miniature these can be made up of Hornby No. 2 Corridor Coaches and the usual Pullman also can be included. A point to notice here is that, although these two types of vehicles are different in design and construction, the same type of corridor connection is used, so that a train can be connected by them throughout just as in real practice.

Turning now to the Western Section, a Southern enthusiast can, if he desires, concentrate his attention on the Southampton and Bournemouth services. These are varied and in miniature a good variety of trains can be represented by the use of the same rolling stock. The *"Ocean Liner"* services between Waterloo and Southampton afford "boat train" interest, and can be run in a very realistic manner if a miniature quayside is included in the layout. Actually quite convincing results can be obtained if the steamers and other marine features are simply shown as part of the scenic background. This is a favourite scheme where space is restricted, and in any case it would be difficult to provide a model sufficiently large to represent a big liner in a satisfactory manner.

The composition of a miniature "Ocean Liner" special can be varied according to traffic; Pullmans sometimes can be included in the make-up consisting otherwise of Standard Corridor Coaches, and at other times an all-Pullman service can be run. In either case it is often necessary to provide additional luggage accommodation. For the purpose the No. 1 Guard's Van can be used as in the upper illustration on this page. Alternatively a No. 2 Luggage Van in S.R. colours can be used just like the real bogie "general utility" vans that are so well known on the Southern.

A layout having no miniature "quayside" can be run on the lines of the real Bournemouth route, a good service of standard corridor trains being operated. A variation can be provided by the operation of a miniature *"Bournemouth Belle"* composed of Hornby Pullmans only. For this the *"Lord Nelson"* Locomotive is appropriate but the ordinary Bournemouth trains are the particular province of the "Schools" class, so here again *"Eton"* is the first choice. Southampton "boat train" duties can be shared by the two types, if both are available, and this applies also to the running of the various fast freight trains that will have to be provided in connection with the supposed arrival of ships.

The S.R. route to the west via Salisbury, Templecombe and Exeter has its own standard services and no Pullmans are found on this route. The usual No. 2 Corridor stock is thus required and a splendid "Atlantic Coast Express" can be formed of these vehicles on a Hornby railway. This main line also has important freight services, and Hornby Milk Vans, covered Luggage Vans, Open Wagons "B" with the characteristic tarpaulin bar are required. Also good use can be made of the Hornby S.R. ventilated containers on Flat Trucks.



On the S.R. in miniature. A Hornby "Eton" Locomotive on a down express passing an up fast freight train. The latter is hauled by a "Lord Nelson" Locomotive.

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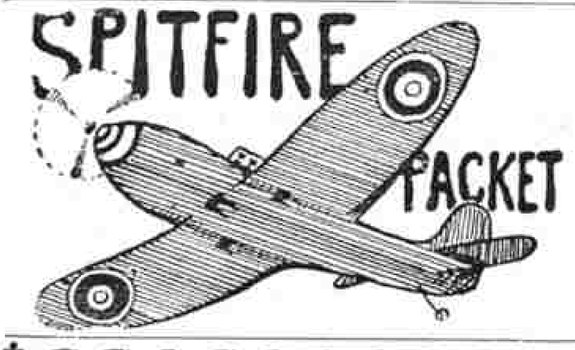
Contains fifty stamps, half used and half unused, from Mozambique (old and new issues), Holland Peace Propaganda, French Guinea, Roumania (King Michael), U.S.A. (Buffalo and commemoratives), Canada, Japan, Germany (Harvesters Provisionals), early British Guiana, New Zealand (pictorials and centenary), unused Chile Air Mail, obsolete pictorial Trinidad and Tobago, Ceylon Jubilee and Coronation issues, etc., price 6d., postage extra. Applicants for approvals get Morocco Agencies (Geo. VI and Postage Centenary) extra. 3 U.S.A. Defence 6d.; 4 Ceylon War 6d.; 23 Germany unused to clear 4d.; 4 Gt. Britain Duke of Windsor 4d.

R. D. HARRISON — ROYDON — WARE

FREE WONDERFUL 1941 OFFER 10 NEW ISSUES AND NOVELTIES

including Czecho-Slovakia (Masaryk), Denmark, **Dominica K.G.VI.** Greece (Charity, Queens Olga and Sophia), Jugo-Slavia (late King Alexander), Morocco Agencies (1d. black Centenary), Turkey (G.P.O. Constantinople). I will send this gift **absolutely free** to all stamp collectors sending 2½d. postage.

G. P. KEEF, WILLINGDON, EASTBOURNE



PACKET contains 38 air, triangular, and stamps with aeroplanes on, etc.—2 LIBERIA triangular (with aeroplane), usually sold at 7d.; NIGERIA (1½d. obsolete); MONTENEGRO (unused); URUGUAY; INDIA (Service); set of 3 CHILE (obsolete); set of 5 JAPAN (obsolete); 2 TANGANYIKA; 3 PALESTINE (pictorials); 6 BRAZIL (including airpost and aeroplane design); 5 U.S.A. (obsolete); 2 JAVA; NEWFOUNDLAND; MANCHURIA (View); MOROCCO, LARGE PICTORIAL; Peru; THAILAND; CEYLON (Geo. Large Pictorial). Price 5½d., postage 2½d. extra, abroad 3½d. extra. Money back if you are not satisfied. Applicants for approvals receive 6 Pictorial S. AFRICA and in addition, those sending addresses of stamp collecting friends get an additional set of 4 GEORGIA. I AM CLEARING A LOT OF USEFUL STAMPS—A FINE ASSORTMENT, 100 for 7d., 200 for 1/-. BETTER VALUES, many usually sold at 1d. and 2d., 100 for 2/6. **BARGAINS**—100 B. Colonials 1/-; 7 Triangular 7d.; 18 Georgia 10d.; 20 Rhodesia 1/2; 24 new Geo. VI 1/2.

H. C. WATKINS, Stamp Importer (M.M. Dept.), Granville Road, BARNET

FREE! GRAND "EAGLE" PACKET

of 25 fine stamps including **ICELAND** (Cod-fish, very beautiful), **RUSSIA**, Gaboon (River Ogowe), stamps from the Dominions, set of 2 large **CRETE**, Jugo-Slavia (King Alexander), Belgium (King Albert), set of 2 **BURMA** (overprinted and obsolete), 2 **CHARKARI** (Pictorials), **EIRE** (Commem. of Easter Week Rebellion), etc., etc., and lastly a **GRAND LARGE LIBERIA AIR MAIL** stamp showing an Eagle in flight.

This fine collection will be sent **ABSOLUTELY FREE** to all collectors sending 3d. to cover postage and asking to see my **"MERCURY"** Approvals.

PHILIP J. DYKE
35, Buckleigh Avenue, Merton Park, S.W.20

BRIGHTEN THE BLACK-OUT

with one of our approval selections. Please state interest and if medium or advanced.

E. & N. GREY, 9, ROSEMARY AVENUE HOUNSLOW

★ FREE ★

Send immediately for our **November Packet** which you can have **ABSOLUTELY FREE.** This packet contains a marvellous collection of COLONIAL, PICTORIAL and COMMEMORATIVE stamps including this attractive two-coloured and scarce Queen Victoria stamp of **LEEWARD ISLANDS** as well as Easter Rebellion commemorative of **EIRE**; a handsome **Duke of Windsor** stamp which was only on sale for a short time; a Commerce & Peace issue of **FRANCE** which is now off sale; an Indian Native State Official from **GWALIOR**; as well as **GERMANY** (Hindenburg); **AUSTRALIA** (Queen Elizabeth); **NEW ZEALAND** and **STRAITS SETTLEMENTS**; **BURMA** (First Issue); **AUSTRALIA** (King, Kangaroo and Ostrich) and **ITALY** (Historical Commemorative). **SEND US** 3d. stamps to cover posting costs and we will **SEND YOU** a Bargain Approval Selection with this wonderful packet **FREE.**

Windsor Stamp Co. (Dept. M), Uckfield, Sussex

DUTCH EAST INDIES and JAPAN

Apply now for our packet of interesting and topical stamps from these vital countries. FREE to all applicants for our renowned Approval Sheets sending 3d. to cover cost of postage.

Offer is for 30 days.

Dept. 363, ERRINGTON & MARTIN
South Hackney, London E.9. Est. 1880

100 DIFFERENT STAMPS FREE

to applicants for ½d. approvals.

COX, 17, STONELEIGH PARK ROAD, EWELL

NO FREE STAMPS

after these years of advertising BUT I still give a good discount and send a list including ALL Coronation Sets complete, Jubilees, Commemoratives, etc., that may be obtained free as bonus gifts for purchases. If you want personal attention and a fair selection of stamps from ½d. then send me 2d. to help with postage, etc. **C. A. RUSH, 38, QUEEN'S AVENUE, WHETSTONE, N.20**

THE FIRST STAMP EVER ISSUED

(British 1840 Penny Black) for P.O. **4/6!** It is guaranteed genuine in every respect. Its companion stamp (1840 2d. blue) for a further **7/6** (cat. 17/6)! Other "Classics" which every collector should have are the **Cape of Good Hope Triangulars**; we offer 1d. rose (cat. 40/-) for **12/6**; 4d. blue (cat. 15/-) for **5/-**; and 6d. pale lilac (cat. 40/-) at **15/-**. Superb approvals of any country against approved English References or a deposit. **Full Lists Free.**

NORRIS & CO. (DEPT. M), SOMERCOTES, DERBYSHIRE

MINT STAMPS

POST EXTRA. New Caledonia "De Gaulle" issue, set of 35 for 20/-; New Hebrides "De Gaulle" issue, 5c., 10c., 15c., set of 3 for 5/6; French Oceania "De Gaulle" issue, set of 11 for 35/-; Ceylon 1941 Prov. 3c. on 6c., 4d. each; Sudan 1941 new design 15 mils., 6d. each; 3 pias., 1/- each; 4 pias., 1/3 each; Bermuda 1941 3d. blue and black, 5d. each; Seychelles 1941 new series 30c., 8d. each; 75c., 1/6 each; 1 rupee, 2/- each; Nigeria 1941 2½d. orange, 4d. each. **Harrowven (MM), 29, Berners Close, Norwich**

HOSPITAL STAMPS

75 Different Foreign and Colonial Stamps selected from Collections presented to Hospital. Send 6d. and stamped addressed envelope to:

SECRETARY, Memorial Hospital Hall, Woolwich, LONDON S.E.18

An approval sheet from our limited number will be sent on request.

A FEW ATTRACTIVE BARGAINS

CORONATIONS: Complete 202 values, mint 42/6, used 49/6. **CROWN COLONIES**: 135 values, mint 21/6. **DOMINIONS**: Mint 24/-; single sets, ask for price list. **SOUTHERN RHODESIA**: Mint 3/-. **GT. BRITAIN**: King George VI, 2/6, 5/-, 10/—4/-, superfine copies. **CEYLON**: King George VI, to 1 rup., 10 values, used 1/9. **MOROCCO**: Edward VIII, 11 values, mint 1/- per set. **GREEK** Occupation of Albania mint, 10 values, 1/9 per set. Three **RUSSIAN** Airmail 1937 stamps, used 10d. Free French **NEW HEBRIDES** mint, 3 values, 4/-. **HONG KONG** Centenary mint complete 6 values, 4/6. **AUSTRALIA** Centenary 1938 complete 3 values, mint 1/9. **CANADA** Royal Visit mint, 3 values, 10d. **PACKETS:** 100 diff. Pictorials, Whole World at 4/3.

Want lists our speciality, prompt attention.
Postage extra on all orders under 10/-. Cash with order.

A. LANG, Philatelist, 9, Charles II Street, St. James's, LONDON S.W.1

CEYLON STAMPS

ALL USED EXCEPT WHERE STATED

1872-99.	20 different	... 5/-	**1935.**	Jubilee set used	... 4/6
1903-11.	10 different	... 1/3	**1935.**	10 Pics. 2c. to 50c. used	3/6
1912.	10 different 1c. to 50c.	1/3	**1935.**	1 Re used ...	... 4/6
1921-27.	21 different 1c. to 50c. (except 12c.) including dies 1 and 2	4/-	**1937.**	Coronation set used	... 9d.
			1937.	Coronation set mint	... 8d.
1885-1941.	17 diff. surcharged including 3c. on 6c. 1941 mint	5/-	**1938.**	10 Pics. 2c. to 1 Re used	2/-
			1938.	2 Re mint ...	... 3/9
	Above 78 stamps	16/-	**1935-41.**	28 diff. including 3c. on 6c. 1941 mint	... 10/-

Postage extra. Ask for complete lists.

FRED HARLOW, B.P.A., 133, Bradbourne Vale, Sevenoaks, Kent

For SERIOUS COLLECTORS

Our Bargain "Discount" Approvals contain a fine range of picked Modern and New Issues, Pictorials and Commemoratives, etc., from 1d.–6d. each, less a generous discount. (General selections only). Approvals or details are post free, and we do NOT send again unless requested. State whether you want British Colonials, Foreign or both. **POSTAL BUSINESS ONLY**

THE BIRKDALE STAMP CO. (P.T.S.),
Dept. M, 104, Liverpool Road, Southport, Lancs.

For other stamp advertisements see page viii

STAMP COLLECTING

Commencing on Right Lines

NOW that the dark nights are with us once again, and "black-out" conditions prevent almost all forms of outdoor evening occupation, many of our readers will have decided to take up stamp collecting as a winter relaxation. They are to be congratulated on a wise choice. Stamp collecting is the ideal indoor hobby because it can be made to fit in with almost every other topic that may interest the collector, and those who start collecting on right lines and make the best of their winter's occupation will retain their interest when the light evenings return. The object of these Stamp Collecting pages is to help readers to plan their collecting, and all new collectors are invited to consult the Editor whenever they meet difficulties that they cannot solve for themselves.

The first problem that will be met is, what to collect. Stamps offer so wide a field that it is utterly impossible to collect everything. Since adhesive stamps were first issued in 1840 there have been well over 70,000 distinct issues, apart from varieties of those issues totalling many thousands of collectable items. Some of those issues, and not by any means only the early ones, are extremely rare and valuable, quite outside the range of a young collector's pocket. The decision therefore must be to concentrate in some manner, for completeness must be the aim of every good collection.

We suggest that no attempt should be made to collect by countries at first. It is far better to deal with one subject, and to collect only designs that appeal. For example, one reader may be interested in railway working. Let him collect all the stamps he can secure bearing designs of locomotives, railway bridges, stations and so on. Another boy keen on outdoor sport may build a collection of sporting designs. Yet another with musical inclinations may concentrate on portraits of famous musicians and composers. Others may like ships, natural history, plant and tree life, native customs and costumes, and they will find hundreds of stamp designs in each of these subjects.

One advantage of this form of collecting is that it takes the collector among the issues of a wide range of countries. He learns to know currencies and other important details about stamp issuing countries, and will find this knowledge useful when at length he decides to concentrate on the stamps of just one country.

We do not suggest that a new collector should ignore all stamps outside one chosen field. That would be foolish. In most cases, the greater part of a new collector's stamps come as gifts from friends, and the gifts will not come rolling in as he would wish if he disdains all but those in his favourite subject. It is wise to take everything that is offered, but to buy only in the one field.

Stamp collecting is one of the few hobbies in which one can have one's cake and eat it! One can spend money on it and enjoy the fruits of one's spending, yet if it has been carried out wisely the outlay can be recovered at a later date. At the same time, stamp collecting is not a moneymaking game. It is definitely a hobby, but careful buying can ensure the return at some future date of a great part of the money spent on it, for there is always a market for complete sets of stamps. Oddments can rarely be sold, except at "throwaway" prices.

In buying, only perfect specimens should be considered. Dirty, heavily postmarked specimens are dear at a quarter of the price asked for clean, lightly postmarked copies. Damaged copies are worthless and, what is more important, they are an eyesore while they remain in a collection.

The object of a stamp collection is to give pleasure to the collector as he turns over the pages of his album and contemplates the array of stamps. Here is a simple test of this advice, a test that every reader can make. Take just one ugly, damaged stamp, or a heavily postmarked one, and lay it in position on a page of clean perfect specimens. Immediately, the page loses a lot of its attractiveness, the one bad stamp creating an air of untidiness and dirtiness.

Should one collect used stamps, unused stamps, or a mixture of both? This question is not a simple one to answer. New collectors should take all the clean stamps they can get. Mostly the gifts will consist of used stamps, and used stamps therefore must be collected; but in the album they should be kept on separate pages from the unused specimens.

That suggestion brings up another important point. What sort of album should be used? If the reader has his choice on this point, he should unhesitatingly take a loose-leaf album with blank pages. The fixed leaf album, probably possessing maps and illustrations of stamps, looks very attractive in its empty state, but it has many disadvantages. Its pages are limited in the number devoted to any individual country. That is inevitable, since it seeks to provide space for every country in the world. Few boys can hope to acquire representative selections of every country, however, and in the result the fixed leaf album tends to become awkward as its space for one country becomes filled to overflowing, while pages devoted to many other countries remain empty. Further, any album arranged country by country is useless to the collector who is building a subject collection.

On the other hand, the blank loose-leaf album is accommodating. Its pages can be used exactly as required, for countries or for subject. Additional pages can be fitted in just where they are required, and there is never any waste space. Ready-printed titles can be bought for fixing at the page heads by boys who feel unequal to doing their own titling.

Lastly, the loose-leaf album's blank pages permit the collector to add notes concerning the stamps displayed, without spoiling the appearance of the pages. Indeed, properly written-up pages have a fascination all their (Continued on page 360)

Stamp Collecting—

(Continued from page 359)

own, and in next month's article we intend to devote some of our space to this important subject of writing-up. It "makes" a collection. A few weeks ago a beautifully written-up series of subject collections was offered at auction in London, each little collection being offered as a separate lot. They realised on an average just half as much again as estimated on the basis of the values of the stamps forming the collections.

The stamps on this page and on page 359 have been chosen to demonstrate some of the points dealt with in this article. Thus we have a variety of subjects, including a group of ship designs, a tiger from the Malay States and a camel from the Sudan. There is a native basket-maker from the Congo, a spray of cotton blossom from Egypt, and illustrations of architecture, ancient and modern, from Iraq and Palestine, respectively. Other interesting examples are the harbours at Hobart, Tasmania, and Saida in Lebanon; a map on a stamp from Newfoundland; a portrait of a famous British poet on a Greek stamp, and a mailplane on a French Moroccan issue.

Philately—and Government Revenues

Many countries, including the United States, Canada, New Zealand and Australia, maintain special departments to supply stamps to collectors and dealers. India is the latest British Dominion to adopt such a service, and a Philatelic Bureau was opened at the Bombay General Post Office in June last.

In some countries the sale of commemorative issues to collectors exceeds the quantities actually used for postal purposes. A striking illustration is provided by the Monaco charity issue of June 1939. The series consisted of six very beautiful stamps, the face value of the set, plus premium, being Frs. 28.65. A total of 28,000 complete sets was printed. Stamp collectors took 14,500 sets, dealers ordered 12,000, and only the remaining 1,500 were sold over the Post Office counters at Monte Carlo and Monaco Ville. Thus philatelists provided more than 750,000 francs. About half of this sum was applied to charitable purposes.

Stamp Gossip

and Notes on New Issues

Patriotic Slogans from Canada

Readers who collect propaganda postmarks should be on the lookout for some very attractive patriotic items that have recently been used in Canada. The first consists of a double panel bearing a simple sketch of the Union Jack in the right half and the words *"Enlist Now"* in the left half. It was first used at Toronto on 30th July. Another consists of the capital letter "V" followed by the three dots and dash of the Victory knock. This slogan first appeared at Montreal on 6th August.

A second version of the *"Enlist Now"* cancellation has since been employed in the French-Canadian zones. In this, first noted at Montreal on 1st August, the Union Jack appears in the left half of the panel, the English wording in the right half and, in two lines of type across the bottom of the full width of the panel, the French wording *"N'attendez pas—Enrollez-vous,"* the meaning of which is *"Do not wait. Enlist."*

Something New in War Issues

A stamp issue that will make history will appear in December, when the Polish Government, working from British soil, will issue its own stamps for use in Polish ships on the high seas. This issue will have full official status, for it is in strict accord with the Conventions of The Universal Postal Union, which lay down that a sovereign state may issue stamps to frank letters posted aboard its ships at sea. The series will consist of eight stamps, four showing scenes of war's ravages in Poland and four paying tribute to the Polish armed forces. The most interesting design will be a view of the famous Polish submarine *"Orzel"* shown on a 1.50 zloty value.

Stamps on the Dollar Front

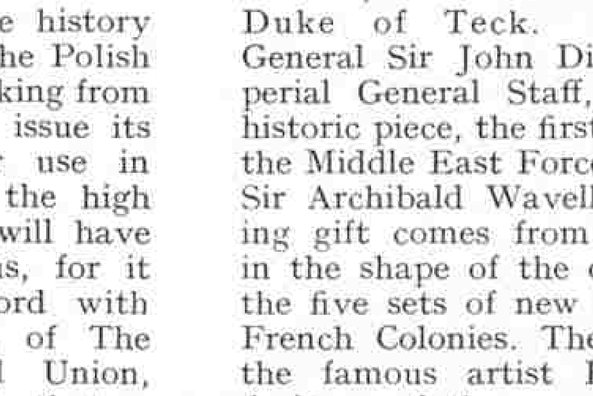
A simple illustration of the great part that stamps are playing in Britain's war economy is gathered from the recent programme of stamp auctions held in the United States. The programme covered a period of six weeks and listed 19 auctions. Of these no less than 14 were promoted by London stamp auctioneers who are selling British-owned stamp collections in the United States to raise dollars. Large contributions have been raised for the war effort by these and other stamp sales in the States.

Stamps to Aid the Red Cross

The second Red Cross stamp auction is to be held in London on 30th and 31st December and 1st January. A definite target has been chosen in an effort to achieve this time something worthier of Britain's philatelists than the result of the first auction, held last Spring, when a three-day effort realised only £3,700. The target is £10,000, enough "to run the Red Cross for a day," and the chosen day is New Year's Day.

Already some very valuable gifts and interesting pieces have been presented for auction. The King has sent an historic cover addressed to him at President Roosevelt's home at Hyde Park during his visit to the United States in June 1939. A letter addressed to a King of England outside his own Empire, at the home of the Head of a great Foreign Power, is indeed a rarity that will be eagerly sought by collectors.

Queen Mary has given a set of the original Orange Free State issue in an envelope addressed to her brother, the late Duke of Teck. General Sir John Dill, Chief of the Imperial General Staff, also has given an historic piece, the first airgraph letter from the Middle East Forces, signed by General Sir Archibald Wavell. Another outstanding gift comes from General de Gaulle, in the shape of the original drawings for the five sets of new stamps for the Free French Colonies. These drawings are by the famous artist Edmund Dulac, co-designer of the current stamps of Great Britain, and the drawings are signed by the artist and General de Gaulle.



A New Use for Stamps

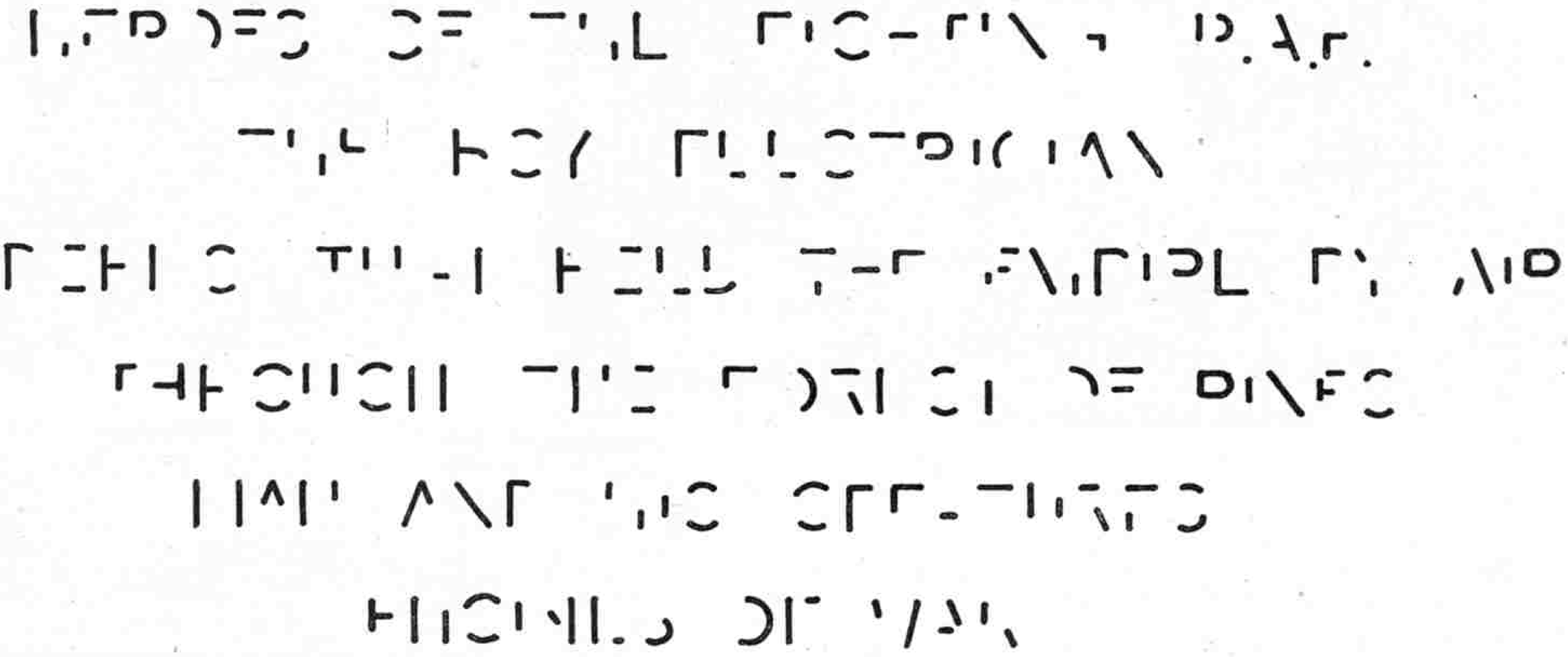
A wise School Attendance Officer in St. Louis, in the United States, found a smart way of enticing truants back to school. He persuaded schoolmasters to use stamps to illustrate lessons and to give packets of stamps and stamp albums as prizes for regular attendance. Once his scheme got properly under way, there were no truants when stamp albums were the lesson books!

* * * *

Arrangements are being made for printing Ceylon's stamps in Australia during the continuance of the war, to avoid difficulties arising out of shipping delays. As we have already noted in the *"M.M."* current supplies of stamps for the Sudan are being printed in India for the same reason.

COMPETITIONS! OPEN TO ALL READERS

WHAT BOOK TITLES ARE THESE?



Here is a splendid opportunity for sharp-eyed readers to win good prizes in an easy and fascinating contest. The mysterious marks shown in the six lines above are the remnants of the titles of six books that have been reviewed in the "*Books to Read*" page of the "*M.M.*" These titles have been disguised by removing parts of the letters in the words forming them, but no letter has been removed entirely, and nothing has been added. Readers are asked to fill up the gaps and thus to reproduce the titles.

Every reader should enter this contest, even if he is a new one and therefore cannot trace the books in back numbers of the Magazine. It is not necessary that the titles should be known, for all the words in them are of a general type, and keen readers should have no difficulty in completing the letters and so in arriving at the correct solution to the mystery.

When the titles have been discovered all that is necessary is that they should be written out in order. Entries should be addressed "*November Book Title Puzzle*, Meccano Magazine, Binns Road, Liverpool 13." Even if a list is incomplete it should be sent in, for there will be consolation prizes as well as those announced in the panel on this page. In the event of a tie the judges will decide from the novelty and neatness of the entry.

Locomotive Voting Contest

Railway enthusiasts often enjoy lively arguments as to which are the best locomotives in the country, each giving reasons why some particular engine is his own favourite. This month we are giving these enthusiasts a chance to settle all arguments in a voting contest, in which the candidates are 12 of the finest and most representative locomotives of the four British railway companies. The list is as follows:

1. G.W.R. "Castle" class.
2. L.N.E.R. "Green Arrow" class.
3. S.R. "King Arthur" class.
4. L.M.S. "Patriot" class.
5. L.N.E.R. Streamline "Pacific" class.
6. S.R. "Schools" class.
7. L.N.E.R. "Hunt" or "Shire" class.
8. G.W.R. "Hall" class.
9. L.M.S. "Princess" class.
10. L.M.S. "Standard Compound" class.
11. S.R. "Channel Packet" class.
12. G.W.R. "Manor" class.

Every reader is asked to state which of these locomotives is his favourite, and then to place the 12 in the order of popularity that he thinks will result from this contest. It is not necessary that his own favourite locomotive should be placed at the head of this list, and indeed he should not put it there unless he is quite sure that it will prove to be the general favourite.

As this is a simple voting contest entries can be made on post cards. The owning company and class of the locomotive of the competitor's own choice should be given first in full, and in the list that follows numbers only should be used to indicate the 12 subjects of the contest.

The prizes to be awarded in this competition are set out in the panel on this page. Entries should be addressed to "*Locomotive Voting Contest*, Meccano Magazine, Binns Road, Liverpool 13," and every reader should vote in this contest, which is open to all.

PRIZES IN THIS MONTH'S CONTESTS

"Book Title Puzzle" and **"Locomotive Voting Contest":** In each of these contests there will be two sections, for Home and Overseas readers respectively, and in each cash prizes of 21/–, 10/6 and 5/– will be awarded for the best entries.

"Photographic Contest": In each section of both the Home and Overseas contests cash prizes of 15/– and 7/6 will be awarded.

Consolation Prizes will be awarded for other meritorious entries in all contests.

Closing Dates: Home Sections, 29th November; Overseas Sections, 31st March 1942.

November Photographic Contest

Here is the eighth of our 1941 series of photographic competitions, in which competitors are asked to submit photographs of any kind that they have taken themselves. An entry may consist of more than one photograph, but each print submitted must have on the back of it a title. If a photograph is given a general or fancy title the real name of the place shown also must be written on the back, while the competitor's name and address, and age also must be given.

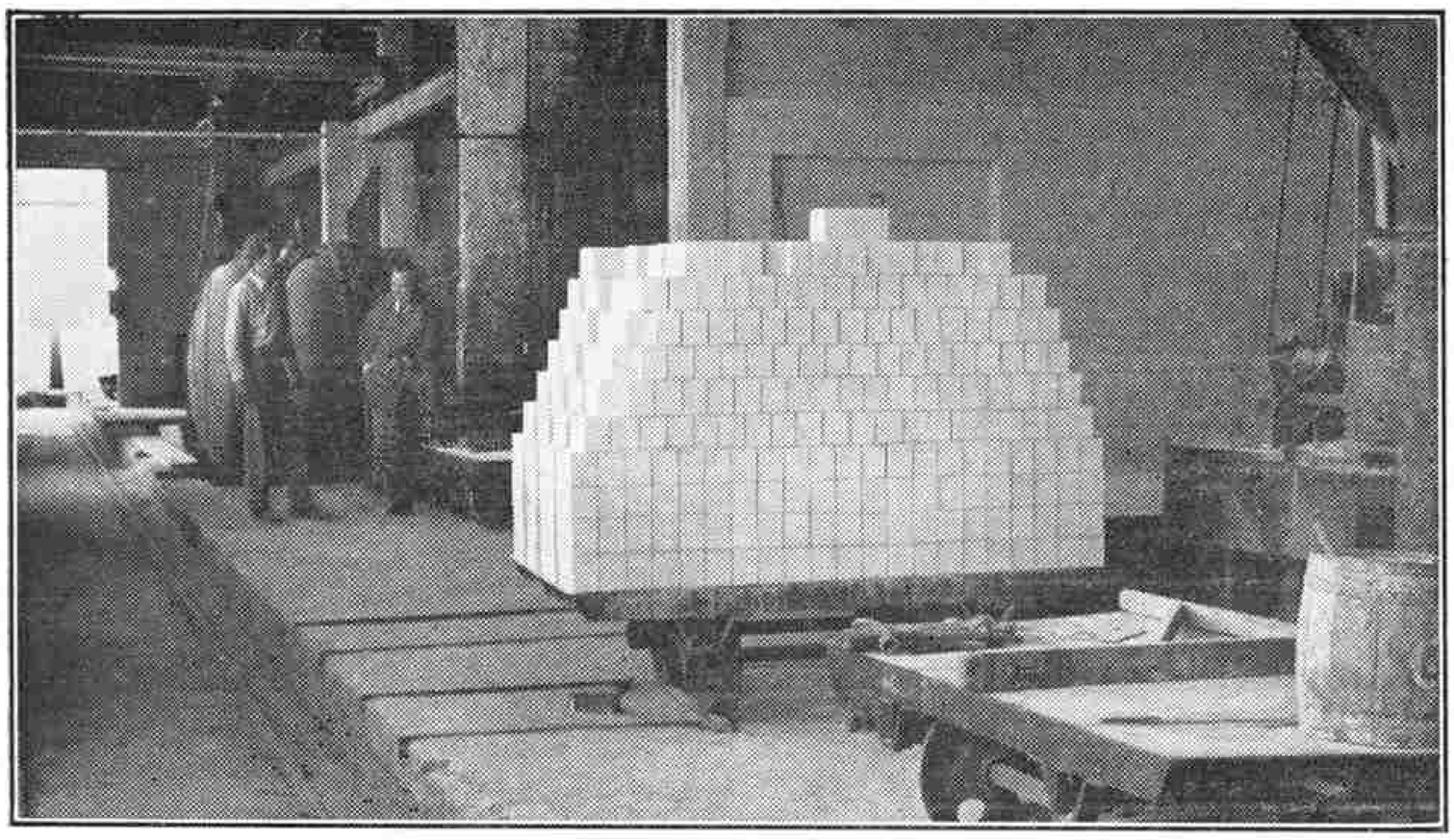
It is not necessary that the developing and printing should have been done by the competitor. These can have been carried out professionally, so long as the entrant himself has made the exposure. Competitors should take care to avoid including in their photographs any scenes or objects of military, naval or Air Force interest.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "*November Photo Contest*, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for overseas readers.

COMPETITION RESULTS

HOME

July "Photographic" Contest.—First Prizes: Section A, D. C. FINLAY (Glasgow W.4); Section B, M. W. TAYLOR (Southall). Second Prizes: Section A, G. GEMMILL (Burnley); Section B, D. H. LANCASHIRE (Warrington). Consolation Prizes: W. BARR (Birkenhead); J. T. COSGROVE (High Wycombe); A. C. ELLIS (Huddersfield); P. G. LUND (Leicester); S. S. PETHYBRIDGE (Newton Abbot); R. J. TAYLOR (Bradford).



Car loads of bricks just out of the kiln at the Silicate Brick Works, near Haifa, in Palestine. These bricks are remarkable for their light weight and insulating properties.

Bricks Without Clay

A Flourishing Industry in Palestine

By Harold J. Shepstone, F.R.G.S.

WE are all familiar with the Bible story of how the Israelites in Egypt complained that they were expected to make bricks without straw. This complaint has for long been a puzzle, as straw does not appear to be a very suitable material for brickmaking. For long the only explanation that seemed at all likely was that the straw was used as a binding material, but this was not very satisfactory. Some years ago it was found that straw contains a substance that acts on clay in a special manner, making it more plastic. The probable explanation of the trouble, then, is that in the absence of straw the clay the Israelites used would be difficult to mould, and would produce bricks that were easily broken.

Now things have changed; to-day Jews in Palestine are making bricks without clay. Thousands of houses, business premises and factories are being built of silicate brick, which is a white brick made of two very simple materials, sea sand and chalk. At Haifa, the principal port of the country, a plant has been laid down capable of turning out 15 million such bricks a year, sufficient to build nearly one thousand houses.

This is by no means the only silicate brick factory in Palestine, but it is the latest. It recalls the story of how the silicate brick came to be introduced there. When the Jews began to return to the country in large numbers, Palestine experienced an acute shortage of houses. This applied particularly to the Jewish town of Tel-Aviv, which lies to the north of Jaffa and is to-day the largest city in Palestine, having a population of some 200,000, all Jews.

The principal building material of Palestine is stone. All the historic buildings of the country, many of them centuries old, are of this material. The country has many fine quarries, particularly in the neighbourhood of Jerusalem and Bethlehem, producing a high-grade building stone. But cutting and dressing stone for building purposes takes time; furthermore it has to be done by competent masons, and there were not sufficient masons available to turn out the large quantity of stone needed.

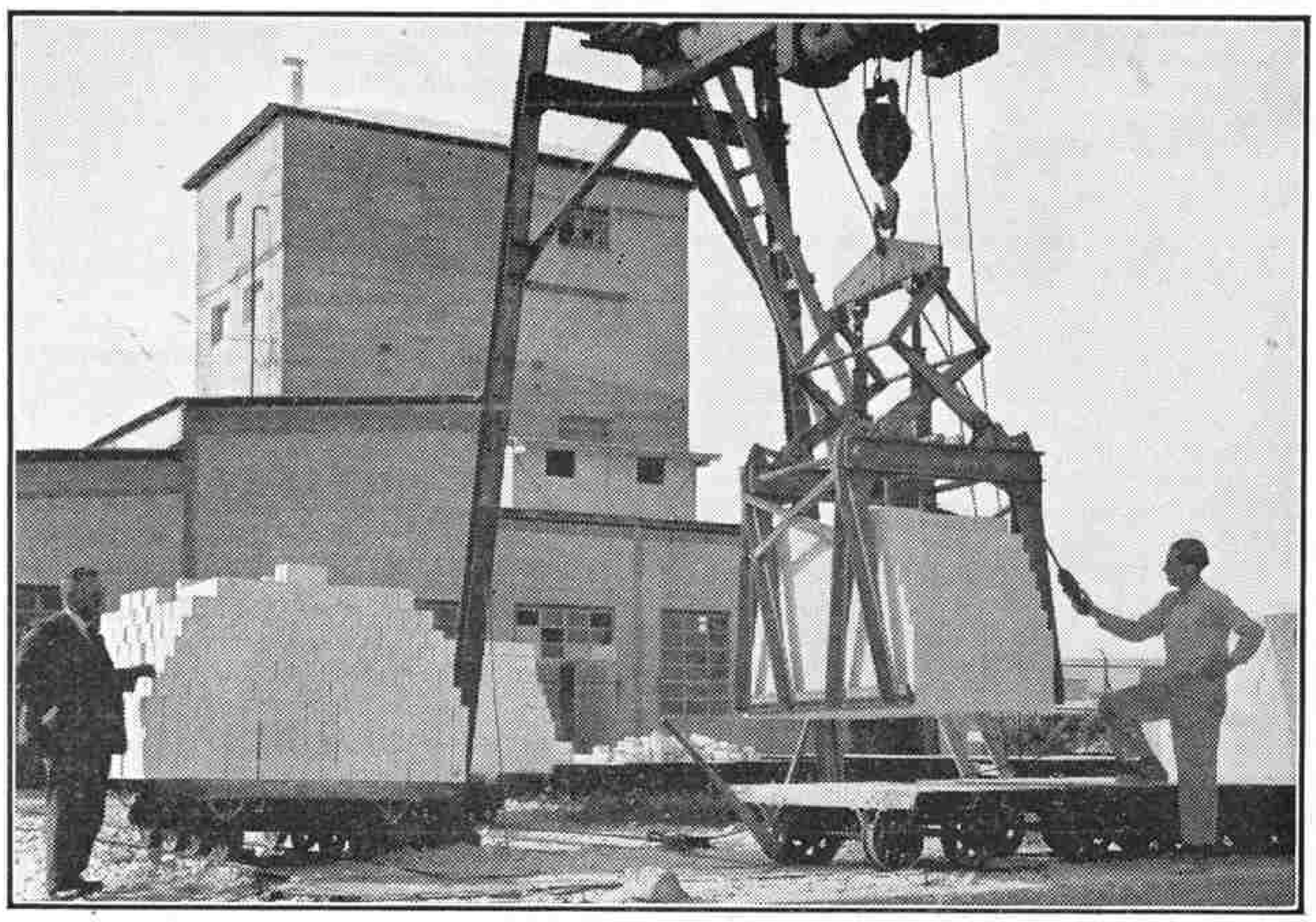
In most countries ordinary dwelling houses are built of bricks made from a loamy clay known as brick earth, and burned in a clamp or kiln. Babylon and Nineveh of ancient times were built of bricks, which also were of clay mixed with grass or straw. After these bricks were fashioned they were hardened by drying in the sun, and such sun-dried bricks were ideal for a dry and warm climate. Among ruined cities in Egypt, Iraq and Iran, thousands of such bricks are to be seen to this day, wonderfully preserved considering that some of them are at least 4,000 years old. Bricks of this kind would be useless in this country, as they are liable to split in frosty weather. The Romans improved on the Babylonian bricks by using a different and more suitable kind of clay, and by baking in a furnace.

Silicate bricks are of fairly recent introduction. The sea sand and chalk required to make them are two very easily secured materials. The factory at Haifa is close to the shore, with the result that the principal raw material is outside its very doors, and can be had for the taking. Chalk, the other necessary ingredient, comes from the hills of Judea. It is first ground into powder, and the sand is passed through sieves to free it from stones. The two ingredients pass to the mixing machines, together with a certain quantity of water for slaking the chalk. After being shaken for three-quarters of an hour the mixture comes out in a fairly solid state. It is now ground into a very fine powder and fed into a press, which forms it into a brick-like shape at a pressure of 10 tons to each brick. There are four of these presses, each capable of turning out 1,200 bricks an hour.

The bricks, which are now nothing more than sand and slaked lime, enter the hardening ovens, and there, under great heat, certain chemical changes take place. To state it briefly, the bricks are transformed into what is termed calcium silicate, a substance that is as hard and as durable as ordinary stone.

Enormous pressure and great heat are the main factors in producing silicate bricks. The nearest approach we have to them in Britain is the bricks manufactured at the shale works in Scotland. Like silicate bricks, these are white, and have a crushing strength of about 2,500 lb. per sq. in.

The silicate brick has proved itself quite suitable as a building material in Palestine, where it has solved the housing problem. Further, the bricks are 30 to 40 per cent. cheaper than ordinary dressed stone.



A block of bricks being lifted en masse and shifted by crane at the Silicate Brick Works near Haifa.

THE MECCANO MAGAZINE R.A.F. RADIO FUND

★

I publish here the final list of subscriptions to *"The Meccano Magazine R.A.F. Radio Fund,"* and I take this opportunity of thanking every reader who has helped to raise the splendid sum of £152. I reproduce also the certificate from Messrs. Simon Jude and West, Chartered Accountants, of Liverpool, who have very kindly audited the Fund.

I hope soon to publish the first list of subscribers to the *"M.M. Harmonica Fund For The R.A.F."* Large numbers of these instruments are urgently wanted, and I appeal to all readers to help and help quickly.

THE EDITOR

Lloyds Bank Buildings,
11-13, Victoria Street, Liverpool, 2.
8th October, 1941.

Meccano Magazine Radio Fund

ROYAL AIR FORCE COMFORTS COMMITTEE

We have audited the Account of the above Fund, now closed, and certify that the total donations received amounted to One hundred and fifty two pounds (£152), which sum has been duly paid over to the Royal Air Force Comforts Committee.

(Signed) Simon Jude and West.
Chartered Accountants.
Hon. Auditors.

EIGHTH LIST OF DONATIONS

	£	s.	d.
Previously acknowledged	144	6	4
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Loughton Branch, H.R.C.		10	0
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Felton D. F., Birmingham (16th contribution)		1	6
TOTAL:	**£152**	**0**	**0**

Loaves by the Thousand

(Continued from page 335)

sections are linked in an endless chain that moves continuously through the oven, and so carries the loaves from one end to the other.

Each loaf takes about 45 min. to complete its journey, and during its travel it can be inspected through windows in the side of the oven. It is fascinating to look into one window after another while walking from the end of the oven where the unbaked loaves are inserted to the opposite end, where they emerge baked to a golden brown. Through the first window the loaves are seen to have the creamy colour of dough; through the next the effect of baking is beginning to show, and the crust can be seen forming; while on looking through the subsequent windows the perfect timing and heat control are demonstrated by the manner in which the baking is carried to just the right point as the bread reaches the end of the oven. Heating is by five oil-fuel burners, which give clean and easily controlled baking; and the travelling oven-bottom is driven by an electric motor, with a gas-engine as an emergency source of power if current should fail.

When the bread leaves the ovens it still needs careful treatment, for its texture will be spoiled unless its cooling is properly controlled. For this reason it is placed in galvanised metal racks and stored in cubicles that are heat insulated to provide the slow and gentle cooling required.

From these cubicles the bread is transferred direct to lorries and vans, which either take it to the shops or deliver it to the houses of customers. Even the loading is carried out on flow-production lines, for the racks are inserted in the cubicles from one side, and the loading into the lorries and vans is carried out on the other.

Perhaps the most impressive feature of the bakery is its cleanliness, for every room is spotless, with white tiled walls, and every ceiling is "coved" so that no corners can harbour dirt. As bread is a thing that is eaten without any cooking after it leaves the bakery, this clean efficiency is most important.

Facts About "Big Ben"

By M. C. HODDER

From his lofty post in the Clock Tower of the Houses of Parliament at Westminster *"Big Ben"* sends out his voice to the British Empire. In the busy towns and loneliest outposts alike his steady notes broadcast by day and night bring a feeling of exhilaration and confidence, and proclaim to the whole world that London and indeed the whole of Great Britain stand firm and undaunted in the face of savage and murderous assaults. So long as *"Big Ben"* strikes at the appointed hour all is well.

This great clock was made and fixed in the Clock Tower in the year 1858, by F. Dent, the predecessor of E. Dent & Co. Ltd., London, and has been in his charge and that of his successors ever since. It is the largest striking public clock in the world, and the most accurate, the first blow on *"Big Ben"* as the clock strikes denoting the exact hour.

The four dials are each 23 ft. in diameter, the centres being 180 ft. from the ground, and in peace time they are illuminated at night by high-power electric lamps. The figures are 2 ft. long and the minute spaces 1 foot square. The minute hands, made of copper, are 14 ft. long and weigh about 2 cwt. each. The hour hands are 9 ft. long and weigh about 6 cwt. each; they are made of gunmetal. There is a pendulum 13 ft. long, beating 2 seconds, and its bob weighs 4 cwt. The weights of the clock weigh nearly 2½ tons. Winding is effected by electric motor, and is carried out three times a week. There are 292 steps up to the clock room.

"Big Ben," the great bell on which the clock strikes the hours, weighs 13½ tons and the hammer weighs 4 cwt. The four quarter bells weigh nearly 8 tons between them, the weight of the largest being 3 tons 18 cwt., and that of the smallest 1 ton 1 cwt. The clock is not automatically synchronised or controlled, but twice a day it telegraphs its time automatically to Greenwich Observatory, which enables its performance to be checked.

Above the clock are the emblems of the Three Kingdoms and the Principality of Wales. The chimes of *"Big Ben"* are set to the following lines:

All through this hour, Lord be my guide,
And by Thy power, no foot shall slide.

The Brightest Star Visible

Which is the brightest star in the sky? The one that looks the brightest is Sirius, which is so prominent in the sky in the evenings of the winter months, but many more distant stars are brighter. Of these the visible star that probably is brightest of all is one known to astronomers by the name of Upsilon Sagittarius. This actually is at least 45,000 times brighter than our own Sun, and actually may be 70,000 times brighter. Much of the real brightness of its light is lost during its long journey through space, a journey that takes 9,000 years, although light travels 186,000 miles in a second. It is interesting to realise that we do not see the star as it is to-day, but as it was 9,000 years ago.

FIRESIDE FUN

THE REASON

Customer (angrily): "Those apples you sold me yesterday had a fishy taste."

Shopkeeper: "Quite right, madam. They were crab apples."

* * * *

"Wasn't Granny pleased to see you, Bobbie?"

"At first, but it soon wore off."

* * * *

Hostess (gushingly): "You know, I've heard a great deal about you."

Politician (absently): "Possibly, but you can't prove anything."

* * * *

Extract from a schoolboy's essay: "A bolt is a thing like a stick, of hard metal, such as iron, with a square bunch on one end and a lot of scratching wound round the other end. A nut is similar to a bolt, only just the opposite, being a hole in a small chunk of iron, sawed off short, and wrinkles round the inside of the hole."

* * * *

Welshman No. 1: "I never tasted such fine cheese in all my life any more."

Welshman No. 2: "So did I neither."

Welshman No. 3: "Neither did I too."

* * * *

Two small girls were having a tremendous argument.

"My daddy's a mounted policeman," said Betty. "He rides a horse all day."

"That's no better than being an ordinary policeman like my daddy," said Peggy, proudly.

"Oh, but it is," said the first child. "If there's any trouble, he can get away quicker."

* * * *

Back in the 80s a noted physician, a teacher in a London medical school, was named a member of the staff of physicians at Buckingham Palace. Explaining why he could no longer conduct his classes the doctor wrote this message on the blackboard:

"Dr. Blank regrets he can no longer meet his classes as he has this day been appointed a physician to Her Majesty, Queen Victoria."

Beneath this announcement some student wag later wrote: "God Save the Queen."

* * * *

Elsie: "What's the matter in here?"

Reggie: "Grandpa's showing dad how to do my homework."

* * * *

"Oh, dear!" cried the landlady. "I've just seen a mouse in the larder. What shall I do?"

"Shut the door," said the boarder, "and let it starve to death."

* * * *

Passenger: "What's the use of time-tables, if the trains are always late?"

Porter: "What's the use of waiting rooms, if the trains are always on time."

* * * *

NOTHING TO WORRY ABOUT

Highwayman's victim: "Please be careful with that gun, it may go off."

Highwayman: "Don't worry about that. I can easily re-load."

TUT-TUT!

Mr. Higgins (Passionately): "Call me a fat 'og again an' I'll give you a clip acrorst the ear!"

Mr. Flanagan: "Gettin' sensitive, ain't yer?"

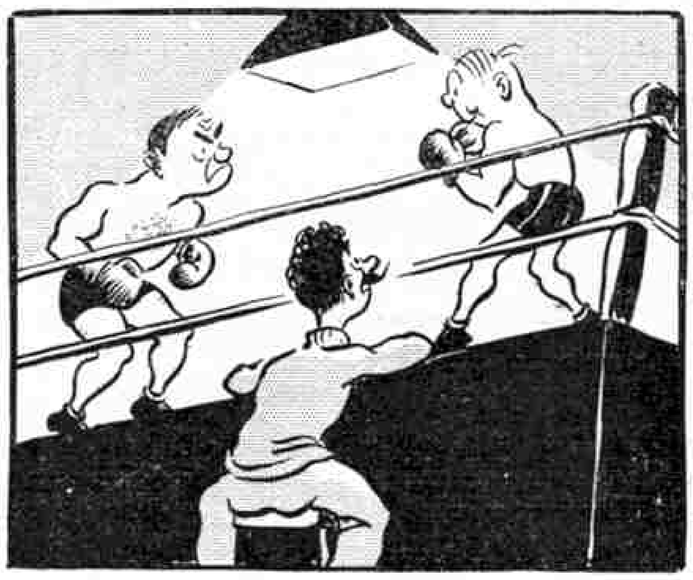
* * * *

"What is the mortar board I hear mentioned so often?" asked the little girl.

"I'll try to explain," said Miss Cayenne, "although it is a slightly complicated matter. A mortar board carried by a builder often has cement on top, and worn by a college professor often has concrete under it."

* * * *

NO CHANGE



Champ: "I'm sorry for you. I was born with boxing gloves on."

Challenger: "Well, I reckon you're going to die the same way."

* * * *

Lady Pupil (after smash up): "Do I need much more before I am able to drive?"

Dejected Instructor: "About a dozen more."

Lady Pupil: "Lessons?"

Dejected Instructor: "No, cars."

* * * *

Father of infant: "What's 'e cryin' for now?"

Mother: "That kid's never satisfied. 'Es 'ad a stick o' rock, fish an' chips, winkles, an' three cornets. And yet 'e don't seem 'appy."

* * * *

SO THAT'S HOW IT IS DONE

"Business is so quiet that we had better have a special sale," said the shoe merchant.

"All right," said the store manager, "what shall it be?"

"Well" said the boss, "take that line of 15/- shoes and mark them down from 25/- to 17/6."

* * * *

An astronomer says the biggest stars are nothing but vast bodies of rarified gas. Hollywood will resent this.

* * * *

"You're home early from the court, Mrs. Murphy."

"Yes, they shoved me out for clappin' when me 'usband got three months."

* * * *

"Did you miss the train, sir?"

"No, I didn't like the look of it so I chased it out of the station."

* * * *

An old lady on a visit to a prison said to one of the prisoners: "How long are you in for, my man?"

"Two months," he replied.

"What is the charge?" she asked.

"No charge," he said, cheerfully, "everything's free!"

* * * *

Tom: "Have you ever wondered what presents you would give if you had Rockefeller's income?"

Tim: "No, but I've often wondered what he would give if he had mine."

* * * *

THIS MONTH'S HOWLER

Cleopatra died when an ass bit her.

THROUGH!

A Home Guard and a 'regular' were disputing their respective skill as marksmen at the local fair, and eventually decided to "shoot" it out at one of the booths, which displayed a number of coloured ping-pong balls supported by jets of water.

With his first five shots the regular brought down five ping-pong balls. He then passed the gun defiantly to the Home Guard. The Home Guard picked it up, raised it to the wrong shoulder, closed the wrong eye, and pulled the trigger. All the ping-pong balls fell.

"I'm sorry, old chap," said the 'regular.' "I didn't realise you were such a crack shot, or I shouldn't have been so boastful."

"Crack shot, be blowed," replied the Home Guard. "Run like blazes, I've killed the bloke that pumps the water!"

* * * *

A tiny evacuee from London refused to eat any greens with his dinner. His hostess said: "You must eat your greens, Johnny. They'll do you good. They're lovely and fresh."

"Fresh?" he said. "Garn. I've seen 'em in the garden ever since I've been here."

* * * *

Irate Mother: "I distinctly told those two boys of mine not to go cycling this week-end, and they've gone."

Neighbour: "Tandem?"

Irate Mother: "No, but just wait till they come back."

* * * *

"You naughty boy, why did you put that hedgehog in your sister's bed?"

"Because I couldn't find a frog."

* * * *

An American traffic sign reads: "Slow down before you become a statistic."

* * * *

Director (putting on his hat and coat) to secretary: "You can answer that letter from Smith, Brown & Co. for me, and sign it 'per pro'—but be careful what you say—don't lose my temper."

* * * *

Clerk: "I'd like my salary raised next week."

Distressed Business Man: "You'll be lucky if I can raise it this week."

* * * *

Asked by her teacher what she thought the word "nonsense" meant, a little girl replied: "Nonsense is when an elephant is hanging over a cliff with its tail tied to a daisy."

* * * *

A man had just insured his house and furniture against fire. As he signed his name he turned to the insurance agent and asked: "What would I get if my house was burnt out to-night?"

"Oh," replied the agent, "I should say about 10 years."

* * * *

Mrs. McMurphy (pointing to dilapidated looking giraffe): "And phwat animal is this thin?"

Mr. McM. (with air of superior knowledge): "Why, an ostrich, sure."

Mrs. McM.: "An ostrich! Then where are its feathers?"

Mr. McM. (contemptuously): "Don't bethray ignorance. Don't ye know that ostriches moult at this toime o' the year?"

* * * *

A parrot was sitting in the saloon of a luxurious liner watching a conjuror do tricks. The magician served notice that he was now going to do a trick never before accomplished. He pulled up his sleeves and proceeded to make a few fancy gestures. Just at that moment the ship's boilers exploded. Five minutes later, as the parrot came to, floating on a piece of driftwood, he muttered: "Very clever, very clever."

* * * *

An Englishman and an American were watching Vesuvius in eruption.

"Well, my friend," said the Englishman, "I don't think you have anything in your country to equal that."

"Perhaps not" was the reply," "but we've a fire brigade in New York that could put it out."

* * * *

THE PROOF

Mother: "I don't believe you have washed your face, after all."

Son (indignantly): "Well, look at the towel!"

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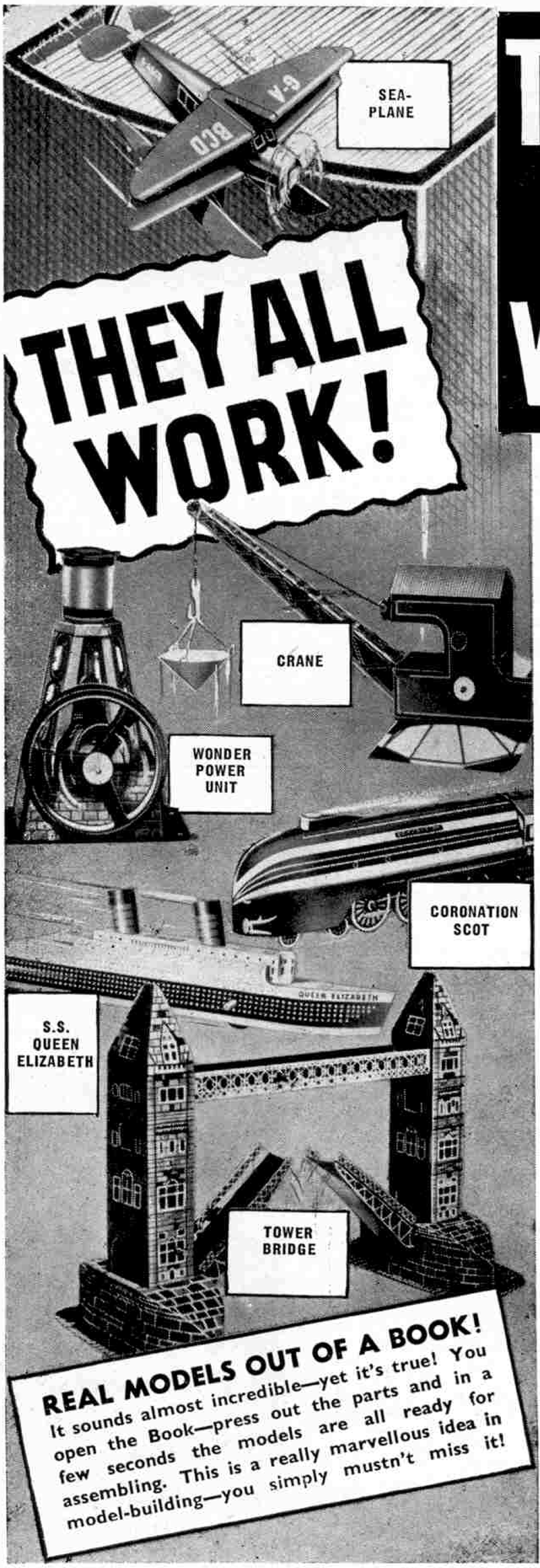
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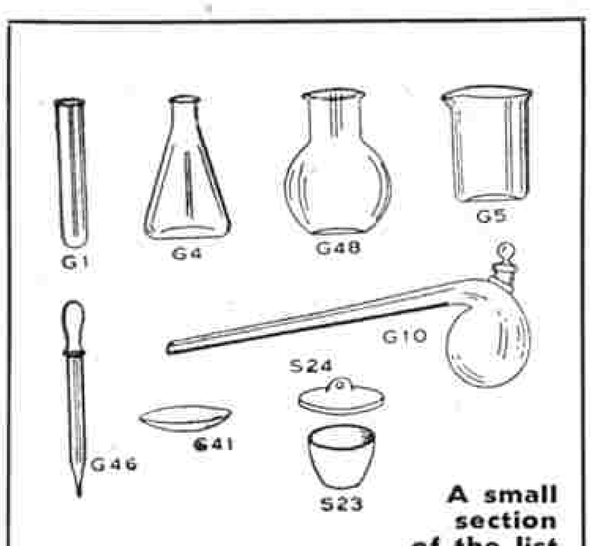

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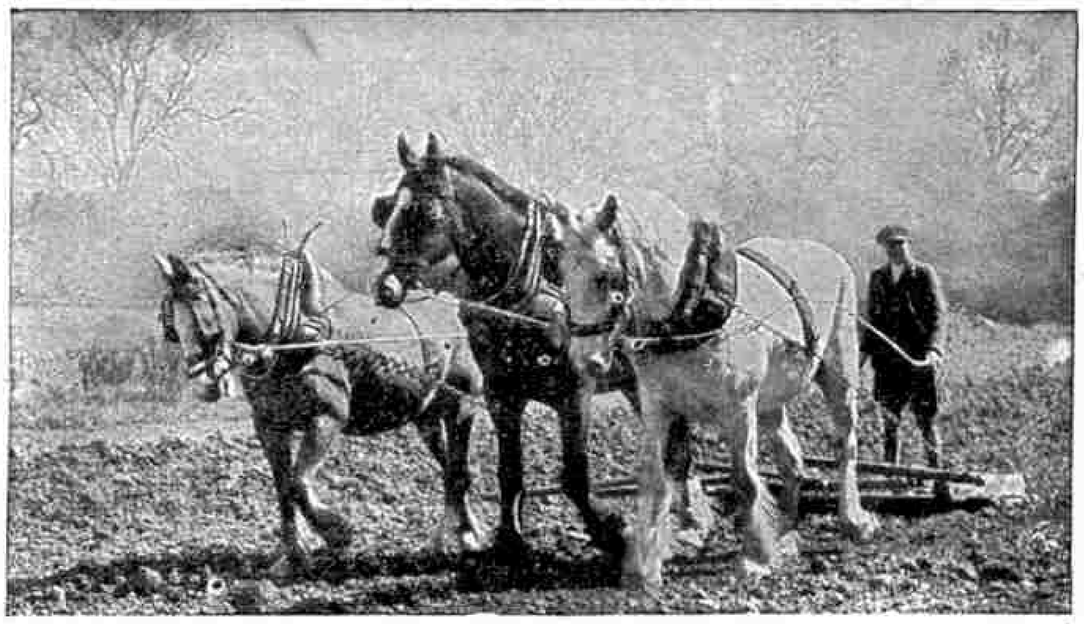

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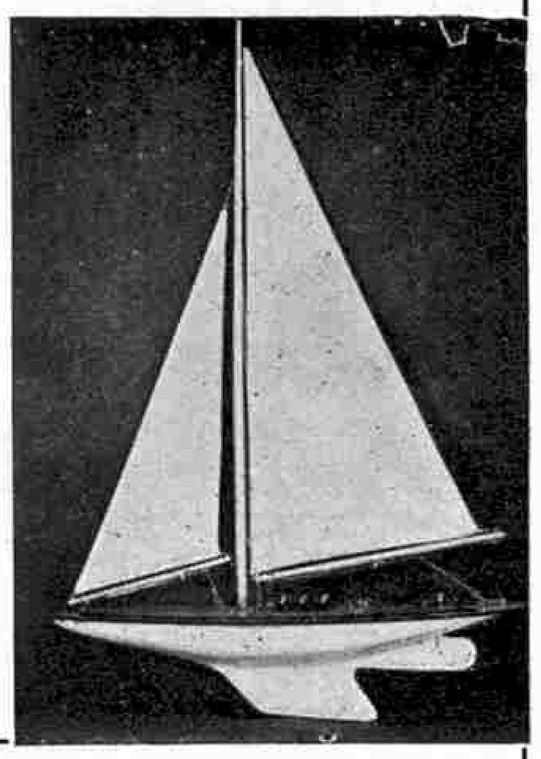

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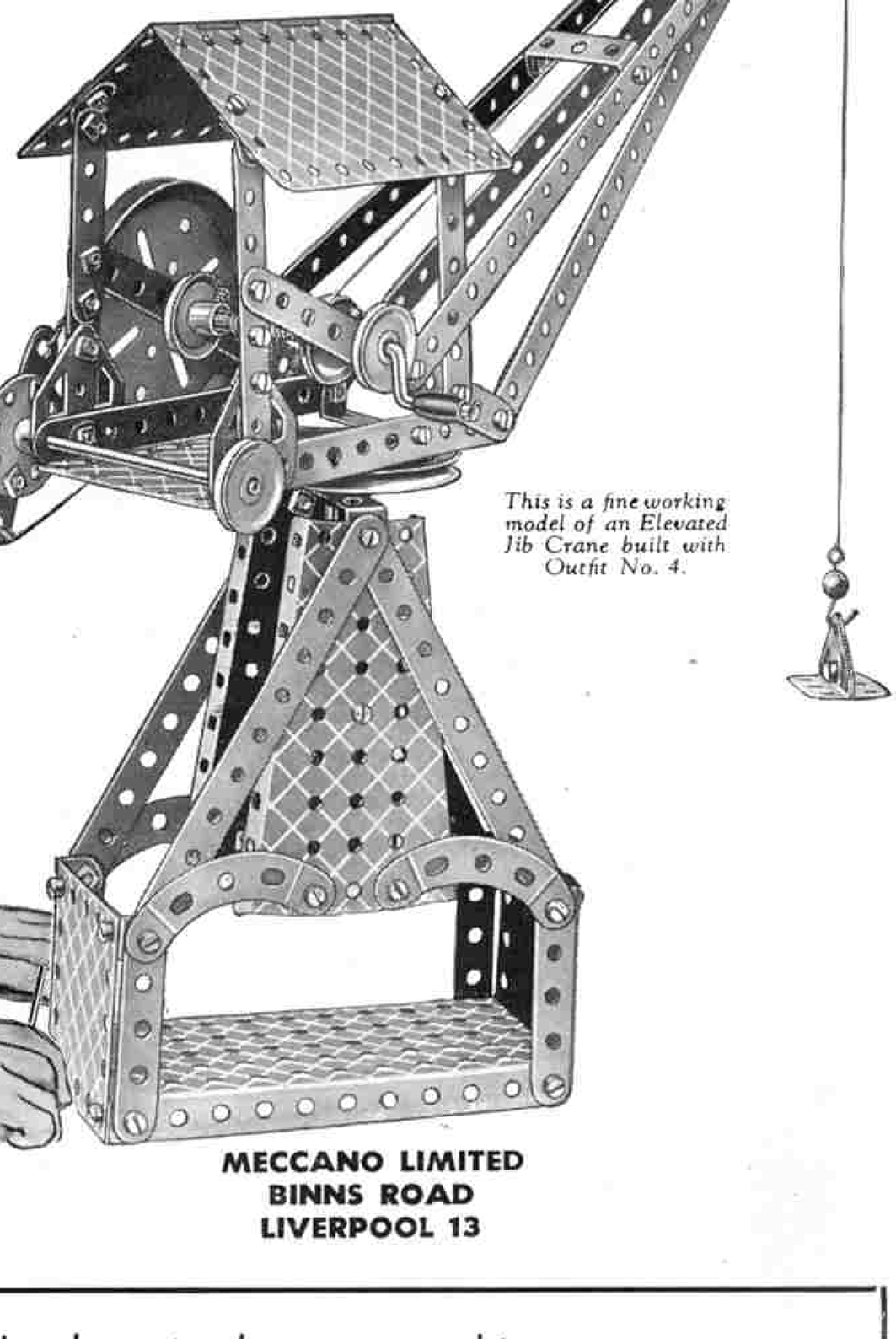

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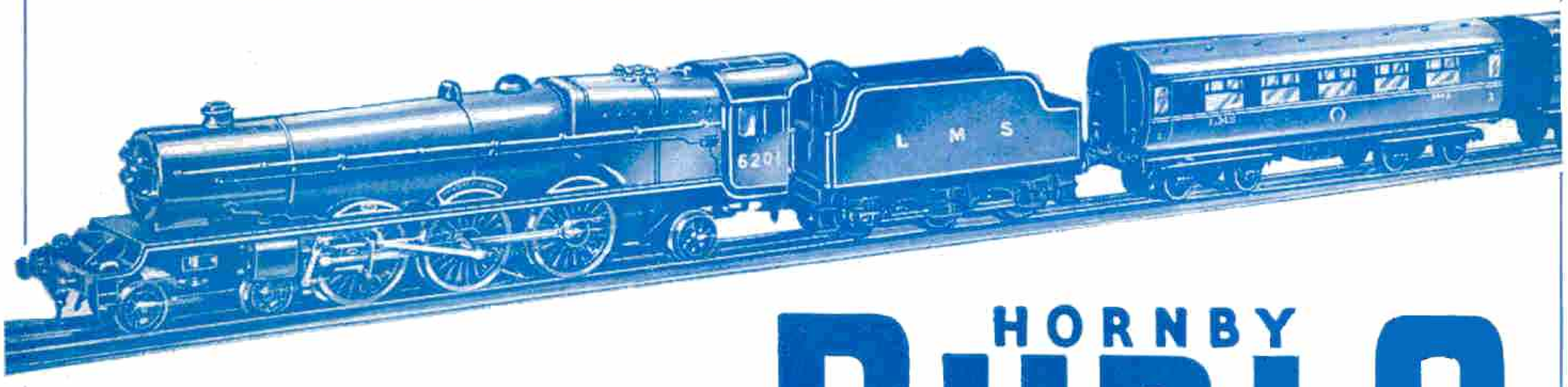

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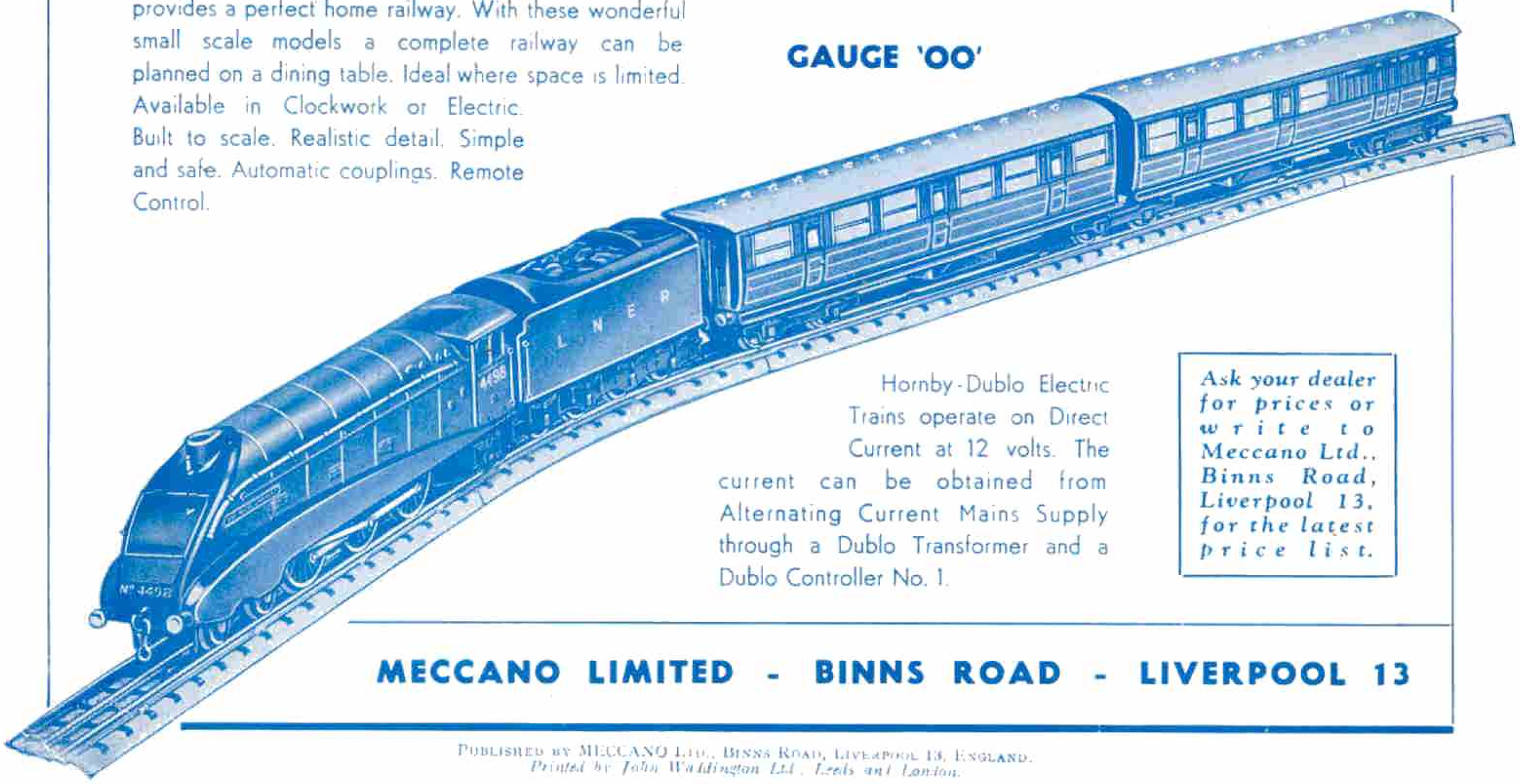

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